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DISTRIBUTION OF THE FORAMINIFERA IN THE NORTHEASTERN GULF OF MEXICO

By

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(With Thirteen Plates)

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INTRODUCTION

The distribution of the Foraminifera in the northeastern Gulf of Mexico has been studied to supplement the previous report by Phleger and Parker (1951) on the northwestern Gulf of Mexico. The area studied extends from the Mississippi River to Cedar Keys, Florida and southward from Cedar Keys excluding the continental shelf but extending westward from a depth of 100 m. in a series of zigzag traverses south to the Dry Tortugas. It includes roughly the region between N. Lat. 25-30° and W. Long. 83-90°.

In studying the foraminiferal distributions emphasis is given to establishing criteria by which the various environments may be recognized. In order to do this the death assemblages of planktonic and benthonic Foraminifera have been studied throughout the area and the living assemblages for a large part of it, excluding the continental shelf stations east of Mobile Bay, Alabama. Temperature and salinity data are given. The sediments are being studied by H. C. Stetson and no description of them is given at this time.

The samples were collected by H. C. Stetson using the Woods Hole Oceanographic Institution R/V ATLANTIS. Study of the Foraminifera has been supported by the Office of Naval Research (Project NR 081-050, Contract Nonr-233 Task I). H. C. Stetson, F. B Phleger and W. R. Walton have read the manuscript and made valuable suggestions. Miss Ruth Todd and A. R. Loeblich of the U. S. National Museum have kindly compared specimens of several species with types deposited at the museum. Miss J. F. Peirson assisted with the laboratory work and drafting, and N. M. Curtis photographed the specimens for illustration.

LOCATION OF STATIONS

Figure 1 shows the locations of the stations, and Table 3 gives geographic position, depth in meters, and sampling gear used for each station. For convenience the samples have been divided into eleven traverses. *Traverse I* includes stations 201-211, from 51 m. to 430 m.; *traverse II*, stations 3-24, from 33 m. to 3017 m.; *traverse III*, stations 25-37, from 22 m. to 2388 m.; *traverse IV*, stations 212-225, from 20 m. (Mobile Bay) to 62 m.; *traverse V*, stations 74-97, 99-105, from 20 m. to 1417 m.; *traverse VI*, stations 38-73, 106, from 20 m. to 2697 m.; *traverse VII*, stations 174-191, 107, from 22 m. to 3017 m.; *traverse VIII*, stations 146, 148-172, from 12 m. to 3164 m.; *traverse IX*, stations 137-145, 108, from 183 m. to 3160 m.; *traverse X*, stations 126-136, from 950 m. to 3180 m.; *traverse XI*, stations 1, 2, 110-124, from 139 m. to 3283 m.

METHOD OF SAMPLING AND LABORATORY WORK

The samples were collected in 1951 during the months of February and March. Four types of sampling gear were used.

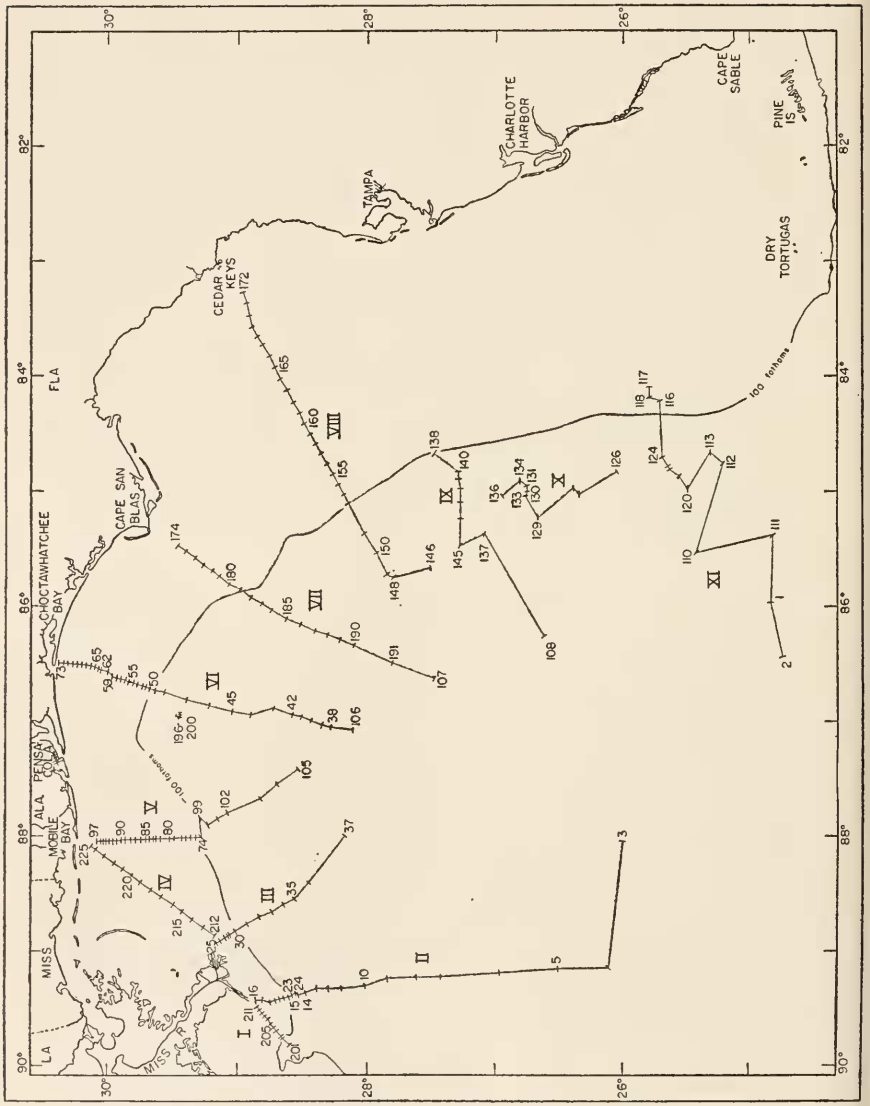

Fig. 1. Northeastern Gulf of Mexico showing station locations.

The Phleger sampler (Phleger, 1952, p. 321) was used where possible. On the continental shelf where the material is shelly and heterogeneous, samples were taken with the orange peel dredge (Phleger, 1952, p. 320) and the Stetson-Iselin sampler (Stetson, 1938, p. 7). In a few places the underway sampler designed by Ewing *et al* (1946, p. 925) was used.

When samples for the study of Foraminifera have been taken with such diverse types of gear, uniformity of results cannot be guaranteed. Such samples do not cover a uniform area and thickness of sediment. An attempt has been made, however, to use equal volume samples. In short cores taken with the Phleger sampler a section from the top of the core including half the surface area to a depth of approximately 2 cm. was taken, giving a sample of approximately 10 cc. volume. Total populations of Foraminifera in the samples taken with other tyes of gear were calculated for 10 cc. of dry material. This material was composed of sand and shells with little or no fine material and had approximately the same volume wet or dry. Samples containing shelly material cannot be measured accurately and for this reason the total populations given on Tables 4-24 should be regarded as representing approximations rather than exact numbers.

Neutralized formalin was added to the short cores at the time of collection so that the Foraminifera living at that time could be studied. After taking the samples from the cores additional formalin was added. It has been found necessary also to add a small amount of sodium carbonate to prevent the formalin from becoming acidic, especially if considerable time is to elapse before the samples are analyzed. Frequent checks of the pH of such samples should be made to insure that the basic character is maintained, a pH of 7-8 being the most satisfactory. Only a few samples exclusive of those taken with the Phleger sampler were preserved in formalin and counts of the living populations could not be made.

The samples were prepared by washing through a brass sieve having average openings of 0.074 mm. More accurate population counts of planktonic Foraminifera can be made using the residue left on a screen having larger openings of 0.114 mm., but this was not done in this case in order that the population counts

would be comparable with those made in the study of the northwestern Gulf of Mexico area (Phleger, 1951). In counting the tests of planktonic forms from this fine material, however, small unidentifiable forms are of necessity omitted. Population counts of living Foraminifera were made using the rose bengal staining technique described by Walton (1952).

TEMPERATURE DISTRIBUTION

There is little available information on temperatures in the northeastern Gulf of Mexico. The temperatures found in the shoalest 130 m. of water depth have been taken from a compilation of data made by Adams and Sorgnit (1951). The data used were from all available bathythermograms for the winter months, January, February, and March, and the summer months, July, August, and September. The coverage of the area is not complete and there are almost no data for the region east of 87° W Long. and north of 29° N Lat. It is probable that bottom temperatures deeper than 130 m. are similar to those in the northwest Gulf of Mexico and these have been taken from Phleger's (1951) analysis of data obtained by the cruises of the MABEL TAYLOR in 1932 and the ATLANTIS in 1935 and 1947. Additional information may modify the situation as described below but it is believed to be a good approximation of the actual conditions.

In winter, isothermal water extends to depths of 15-100 m., in summer to depths of 12-15 m. The seasonal effect may disappear as shoal as 50 m. or may extend to a depth of 150 m. or more. Since present data are limited to the upper 130 m. of water, the exact depth of seasonal effect cannot be ascertained since it is still observable below this depth in many areas. In the northwestern Gulf of Mexico the maximum depth of the seasonal effect is 200 m. according to Phleger (1951, p. 15) and it is probable that it is similar in the northeastern area.

The following minimum and maximum bottom temperatures for the continental shelf shoaler than 50 m. have been deduced from data given by Adams and Sorgnit for the upper 50 m. of water in the various areas within the 100 fathom curve. These would represent average temperatures and would probably be exceeded in many seasons, especially close to shore. Minimum bottom temperatures from 0-50 m. are: 18°C. southeast of the

Mississippi Delta; 21°C. south of Mobile Bay; 18°C. just west of Cape San Blas; 21°C. near Cedar Keys and along the coast of Florida to the south. Maximum bottom temperatures from 0-50 m. are 31-32°C. southeast of the Mississippi Delta, 28°C. south of Mobile Bay, 28-31°C. along the west coast of Florida.

As nearly as can be ascertained from the available data, the temperature at the lower limit of seasonal effect varies from 18°C. to 21°C. Below this point it diminishes to the bottom of the permanent thermocline at 800-1000 m. to 5°C., and deeper than this shows no significant change.

Surface temperatures in the Gulf of Mexico according to Fuglister (1947) range from an average minimum of 20°C. in February to an average maximum of 29°C. in August.

SALINITY DISTRIBUTION

There are few salinity data for the area; the following information is taken from Parr (1935). Nearshore salinities in the upper 50 m. of water are <24 o/oo southwest of the Mississippi Delta (at the position of traverse I), <35 o/oo south of Mobile Bay, and >36.25 o/oo on the continental shelf along the west coast of Florida. These figures might be lowered in the Mississippi Delta area and perhaps to a lesser extent south of Mobile Bay during times of exceptional runoff and mixing but normally there is a steep positive salinity gradient where fresh river water spreads over the surface. Parr gives no data for the shallow area between Cape San Blas and Cedar Keys but it is probable that the salinities are approximately 36 o/oo as they are farther south. At 200 m. the salinity is approximately 36 o/oo, and below this point it diminishes to about 35 o/oo at 400 m. with no significant change deeper.

DEPTH FACIES BASED ON BENTHONIC SPECIES

Introduction

Six depth facies based on benthonic species can be detected in the area. These have been given equal importance in discussion but some are more important than others. An example of this

is the separation of facies 2 and 3; they perhaps should be combined to indicate a major facies change between 80 m. and 150 m. Benthonic facies boundaries are found at: 80-100 m., 130-150 m., 180-220 m., 350-600 m., 900-1000 m. There is a less distinct boundary at 30-50 m. which is considered here to represent a sub-facies boundary in facies 1, and a second one at 250 m. in facies 4. All boundaries are gradational and not sharply defined. Deeper than 1000 m. there are various gradual changes to the greatest depth sampled at 3283 m.; these are not concentrated at any particular depth and will be discussed under facies 6. There is little doubt that a close sampling grid in the shoal area between the shore and 100 m. would reveal more changes in the continental shelf faunas, but such fine gradations cannot be detected in the present reconnaissance sampling pattern. The facies changes indicated here should, therefore, be considered as gross changes. Foraminifera displaced from shoal areas are sometimes found in deep samples. This is especially true at the base of the escarpment parallel to the coast of Florida which is cut by traverses IX-XI. These displacements can be easily detected in analyzing Tables 4-23 which give the percentage distribution of the benthonic species. These tables list the benthonic species as percentages of total benthonic population and give the totals of planktonic Foraminifera found at each station.

In the following section each facies is discussed separately giving faunal characteristics and a detailed discussion of its appearance or non-appearance in each traverse. In this way lateral changes can be indicated for the various depth facies. These lateral changes also will be summarized in a later section. Figures 3-9 show generalized depth ranges of most of the species included in the population counts and the traverses in which they are found. All discussion of occurrence or non-occurrence of any species is based on its presence with a frequency of 0.1 per cent or more of the total population and it is, therefore, possible that the species may occur rarely under other conditions than those listed. Many species which appear only spasmodically in population counts are omitted as such and listed under "miscellaneous spp." in the tables. Table 1 gives a summary of temperature and salinity conditions in the various facies. These should be regarded as approximations.

Facies	Temperature	Salinity
1. 12 m. — 80-100 m. (Subfacies boundary at 30-50 m.)	(15 m.) 18-31°C.* (average) (50 m.) 20-26°C. (100 m.) 17-21°C.	Mississippi Delta 24 o/oo Mobile Bay 34 o/oo West Coast Florida 36 o/oo
2. 80-100 m.—130-150 m.	16-21°C.	36 o/oo
3. 130-150 m.—180-220 m.	(130 m.) 18-20°C. (200 m.) 13-15°C.	36 o/oo (or slightly higher)
4. 180-220 m.—350-600 m. (Subfacies boundary at 250 m.)	(200 m.) 13-15°C. (500 m.) 8-10°C.	35-36 o/oo
5. 350-600 m. — 900-1000 m.	(500 m.) 8-10°C. (1000 m.) 5°C.	35 o/oo
6. 900-1000 m. — ?	5°C.	35 o/oo

Table 1. Temperature and salinity in Facies 1-6 (These figures are approximations and refer in all cases to open-sea conditions).

Facies 1. 12 m. — 80-100 m.

The inner margin of this facies represents an open-ocean condition. In no case does a traverse extend into a bay at its inner end, although common bay forms such as "*Rotalia*" *beccarii* variants often are found in great abundance at the inner ends of various traverses.

The following species are found in facies 1 only:

Elphidium advenum
Globulina caribaea
Guttulina australis
Nouria polymorphinoides
N. sp.
Quinqueloculina bicostata (in most cases)
Q. sabulosa

* Minimum temperature near Mobile Bay and from Cedar Keys southward is 21°C. Maximum temperatures may be somewhat lower east of the Mississippi Delta.

The following species are found in fairly high concentration in this facies only:

Ammoscalaria pseudospiralis (also facies 2, in traverse I)
Asterigerina carinata
Bigenerina irregularis
B. textularioidea
Buliminella cf. *bassendorfensis*
Cibicidina strattoni
"Discorbis" bulbosa
Elphidium discoidale
E. gunteri
E. poeyanum
Epistominella vitrea
Eponides antillarum
Nodobaculariella cassis
Nonionella opima
Peneroplidae
Planulina exorna
Rosalina cf. *concinna*
R. floridana
"Rotalia" beccarii variants
Textularia earlandi
T. mayori
Virgulina punctata

The following species also may be found occurring in this facies including the shoalest stations:

Amphistegina spp.
Angulogerina bella
A. jamaicensis
Bolivina albatrossi
B. barbata
B. lowmani
B. striatula spinata
Buccella hannai
Bulimina marginata
Cancris oblonga (and *C. sagra*)
Cassidulina subglobosa
Cibicides deprimus
C. protubcrans
Elphidium spp. (exclusive of named species)
Eponides repandus
E. turgidus
Gypsina vesicularis
Lagena spp. and related forms
Nonionella atlantica
Planorbulina mediterranensis
Pyrgo murrhina (rare)
P. cf. *nasutus*
Quinqueloculina compta
Q. horrida
Q. lamarckiana
Rectobolivina advena
Reussella atlantica
Robulus spp.
Rosalina parkerae
R. suezensis
Sigmoilina sp.
Spirillina vivipara
Spiroloculina cf. *grata*
S. soldanii
Stetsonia minuta
Textularia candeiana
T. conica
Triloculina cf. *brevidentata*
Uvigerina parvula
Virgulina complanata
V. pontoni
Wiesnerella auriculata

The following species have their shoalest occurrences between 35 and 50 m. and mark the boundary of what is considered here a subfacies:

Alveolophragmium sp.
Bolivina fragilis
B. subaenariensis mexicana
B. subspinescens
Bulimina aculcata
Cassidulina carinata
C. curvata
C. laevigata
Cibicides aff. *floridanus*
C. io
C. mollis
C. umbonatus
Conorbina orbicularis
Gaudryina cf. *aequa*
Goësella mississippiensis (starts at 70 m.)
Lenticulina peregrina
Loxostomum abruptum
Marginulina marginulinoides
Proteonina diffiugiformis
Pseudoeponides umbonatus
Reophax hispidulus
R. irregularis
Rosalina bertheloti
R. floridensis
Seabrookia earlandi
Sigmoilina distorta
Siphonina bradyana
S. pulchra
Spiroplectammina floridana
Textulariella spp.
Trifarina bradyi
Valvulineria minuta

There is considerable change laterally in facies 1. The following are species occurring in this facies, in one or more traverses, with a frequency of 10 per cent or more. They are not necessarily confined to this facies and may be found also in facies 1 at lower frequencies in other traverses.

	Traverse
Ammoscalaria pseudospiralis	I, IV
Amphistegina spp.	VI
Asterigerina carinata	VI-VIII
Buliminella cf. *bassendorfensis*	III
Cibicidina strattoni	IV-VII
Epistominella vitrea	III
Goësella mississippiensis	I
Miliolidae	VII
Nonionella atlantica	IV
N. opima	III, IV
Nouria sp.	I-III
Planulina exorna	V-VIII
Peneroplidae	VI, VIII
Rosalina cf. *concinna*	IV-VIII
"*Rotalia*" *beccarii* variants	II, IV, VI
Textularia earlandi	I-III

It is probable that on the continental shelf along the Florida coast there is a further influx of West Indian forms such as are found in the Dry Tortugas. As can be seen from the above list, the fauna typical of calcareous areas is well established as far west as traverse VI, characterized by the abundance of *Amphistegina, Asterigerina carinata,* and the Peneroplidae. These forms are present, however, as far west as traverse IV.

Facies 1 is found in the various traverses as follows: traverse I, sta. 208-211 (51-73 m.); II, sta. 16-18 (33-88 m.); III, sta. 25-28 (22-106 m.); IV, all stations (20-62 m.); subfacies starts at sta. 221 (35 m.); V, sta. 77-97 (20-75 m.), subfacies starts at sta. 78 (71 m.); VI, sta. 59-73 (20-91 m.), subfacies starts at sta. 66 (39 m.); VII, sta. 174-177 (22-49 m.), subfacies starts at sta. 176 (46 m.); VIII, sta. 156-172 (12-62 m.), subfacies starts at sta. 161 (35 m.). The facies is not represented in traverses IX-XI.

Facies 2. 80-100 m. — 130-150 m.

The following species have their shoalest occurrence at 80-100 m.:

Ammobaculites sp. A.
Bolivina ordinaria
Cassidulina neocarinata
Cibicides corpulentus (starts at 120 m.)
Gaudryina (*Pseudogaudryina*) *atlantica*
Globobulimina mississippiensis
Haplophragmoides bradyi
Höglundina elegans
Liebusella spp.
Nonion formosum
Pseudoclavulina mexicana
P. aff. *novangliae*
Planulina foveolata
Pullenia quinqueloba
Robertina bradyi
"Rotalia" translucens
Rotamorphina laevigata
Sphaeroidina bulloides
Textularia foliacea occidentalis
Trochammina quadriloba
Uvigerina flintii
U. laevis
Virgulina mexicana

The following species have their deepest occurrence at 130-150 m.:

Conorbina orbicularis (160 m.)
Elphidium poeyanum
Eponides antillarum
Gaudryina cf. *aequa*
Gypsina vesicularis
Planorbulina mediterranensis (mostly)
Quinqueloculina bicostata
Q. compta
"Rotalia" beccarii variants

The following species occur only occasionally deeper than 150 m.:

Cassidulina laevigata
Cibicides io
C. mollis
Eponides repandus
Nodobacullariella cassis
Rosalina floridensis
Spiroloculina cf. *grata*
Textularia conica
T. mayori

The following species are not found with frequencies greater than 1 per cent deeper than 150 m.:

Nonionella atlantica
Planulina exorna
Quinqueloculina lamarckiana
Reussella atlantica

There is a marked lateral change in this facies also. The following species are found with frequencies higher than 10 per cent in the various traverses. They are not necessarily confined, however, to facies 2.

	Traverse
Alveolophragmium sp.	I
Ammoscalaria pseudospiralis	I
Amphistegina spp.	VII, VIII
Cassidulina subglobosa	VI
Cibicides protuberans	VIII
Goësella mississippiensis	I, II
Miliolidae	VI (1 sta.)
Nouria sp.	I
Proteonina difflugiformis	I
Rosalina cf. *concinna*	VI, VII
Trochammina quadriloba	I

As can be seen from the above list, many of the species also are found in high frequencies in facies 1. The species having a high frequency in the Mississippi Delta region form a discrete group as they did in facies 1. Facies 2 does not appear in enough of the traverses to give a complete analysis of its lateral development.

Facies 2 is found in the various traverses as follows: traverse I, sta. 204-207 (79-91 m.); traverse II, sta. 19-21 (106-142 m.); traverse V, sta. 76 (99 m.); traverse VI, sta. 54-57 (106-128 m.); traverse VII, sta. 178, 179 (86-146 m.); traverse VIII, sta. 154, 155 (79-117 m.). It is not represented in traverses III, IV, IX-XI. No species are found with high frequencies in this facies in

traverse V. As can be seen, facies 2 is not represented at many stations and it might be more practical in many cases to combine it with facies 3. It seems advisable, however, to give its characteristics for what they might be worth for faunal analysis even though the results may not be statistically valid.

Facies 3. 130-150 m. — 180-220 m.

The shoaler limit of this facies is marked by the following species having their shoalest occurrence at 130-150 m.:

Bolivina goësii
B. translucens
Bulimina spicata
Cassidulina aff. *crassa*
Chilostomella oolina (125 m.)
Eggerella bradyi
Eponides regularis
Globobulimina affinis and variant
Glomospira charoides
G. cf. *gordialis*
Gyroidina orbicularis (165 m.)
Gyroidinoides soldanii altiformis
Karreriella bradyi
Planulina ariminensis
Pseudoglandulina comatula
Pullenia bulloides
Sigmoilina tenuis
Trochammina advena

The following species have their deepest occurrence at 180-220 m.:

Alveolophragmium sp.
Ammoscalaria pseudospiralis
Asterigerina carinata
Bigenerina irregularis
B. textularioidea
Buccella hannai
Cibicides io
C. mollis
"Discorbis" bulbosa
Elphidium discoidale
E. gunteri
Eponides repandus
Globobulimina mississippiensis
Goësella mississippiensis (very occasionally deeper)
Quinqueloculina cf. *polygona*
Rectobolivina advena
Rosalina floridensis
Spirillina vivipara
Spiroplectammina floridensis
Wiesnerella auriculata

The following species do not occur deeper than 220 m. with a frequency greater than 1 per cent.

Bolivina striatula spinata
Reophax hispidulus
Rosalina cf. *concinna*
R. suezensis

Lateral changes are still marked in this facies. The following species occur with frequencies of more than 10 per cent. They are not necessarily limited to this facies.

	Traverse
Alveolophragmium sp.	I
Bolivina barbata	II, III
B. lowmani	VII
B. minima	VIII
B. subaenariensis mexicana	III, VI
Bulimina marginata	II
Cassidulina neocarinata	VI
Cibicides aff. *floridanus*	VII
C. protuberans	IX, XI
Eponides regularis	II
Goësella mississippiensis	I
Proteonina difflugiformis	I
Trochammina quadriloba	I, II
Uvigerina parvula	III, VII

The Mississippi Delta fauna is still prominent in this facies, to a greater extent in traverse I than in traverse II. High frequency occurrences appear to be rather spasmodic but this is probably emphasized by the choice of a definite frequency limit to indicate them.

Facies 3 is found in traverse I, sta. 202 (128 m.); traverse II, sta. 22 (168 m.); traverse III, sta. 29, 30 (155-205 m.); traverse V, sta. 75 (146 m.); traverse VI, sta. 50-53 (139-165 m.); traverse VII, sta. 180 (183 m.); traverse VIII, sta. 152, 153 (146-183 m.); traverse IX, sta. 138 (183 m.); traverse XI, sta. 116-118 (139-155 m.).

Facies 4. 180-220 m. — 350-600 m.

The deeper depth limit of this facies is not sharply defined, but between the depths of 350-600 m. very definite faunal differences occur, and the same is true to a much lesser extent at the shoaler depth limit. There is a less well-defined boundary at 250 m., also, so that the shoaler limit could be defined as 180-250 m. The faunal changes at 250 m. will be listed separately, however, as they appear to form a small but distinctive unit.

The following species have their shoalest occurrence at 180-220 m.:

Adercotryma glomeratum
Anomalinoides mexicana
Bulimina alazanensis
B. striata mexicana
Epistominella exigua
Gyroidina neosoldanii
Hormosina sp.
Laticarinina pauperata
Nodosaria hispida
Sigmoilina schlumbergeri
Trochammina cf. *japonica*
Uvigerina hispido-costata
U. peregrina

The following species have their shoalest occurrence at 250 m.:

Cassidulinoides tenuis
Cibicides robertsonianus
Epistominella rugosa
Loxostomum abruptum
Uvigerina auberiana

The following species have their deepest occurrence at 250 m. (exceptions noted):

Amphistegina spp.
Angulogerina bella
Bolivina fragilis
B. striatula spinata
Cancris oblonga
Cibicidina strattoni
Liebusella spp. (280 m.)
Nodobaculariella cassis
Pseudoglandulina comatula
Quinqueloculina lamarckiana (280 m.)
Reophax irregularis
Reussella atlantica
Sigmoilina sp.
Textularia conica (280 m.)
T. foliacea occidentalis
T. mayori
Triloculina cf. *brevidentata*

The following species have their deepest occurrence between 350 and 600 m.; a few having their deepest ranges shoaler or deeper also are noted:

Ammobaculites sp. A (390 m.)
Bolivina barbata (550 m.)
B. goësii (420 m.)
Bulimina marginata (550 m.)
Buliminella cf. *bassendorfensis* (370 m.)
Cassidulina laevigata (320 m.)
Marginulina marginulinoides (450 m.)
Nonionella atlantica (600 m.)
Planulina exorna (380 m.)
P. foveolata (550 m.)
Pseudoclavulina mexicana (450 m.)
P. aff. *novangliae* (350 m.)
Pyrgo cf. *nasutus* (550 m.)
Quinqueloculina horrida (370 m.)
Rosalina bertheloti (370 m.)
Sigmoilina distorta (550 m.)
Siphonina bradyana (650 m.)
S. pulchra (750 m.)
Spiroloculina cf. *grata* (650 m.)
S. soldanii (320 m.)
Textulariella spp. (320 m.)
Uvigerina flintii (420 m.)
Virgulina pontoni (500 m.)

The following species do not occur with a frequency greater than 1 per cent deeper than 600 m.:

Cassidulina aff. *crassa*
C. neocarinata
Eponides regularis
Planulina ariminensis
Uvigerina hispido-costata

The following species are found with frequencies greater than 10 per cent in the various traverses. Traverses I and II in the Mississippi Delta region still show differences from the more easterly ones:

	Traverse
Ammobaculites sp. A	I
Bolivina albatrossi	VI
B. minima	VIII
B. subaenariensis mexicana	V, VI
Bulimina marginata	II
B. striata mexicana	II
Cassidulina neocarinata	VII
C. subglobosa	IX
Epistominella rugosa	IX
Goësella mississippiensis	I, II
Proteonina difflugiformis	I, II
Reophax scorpiurus	II
"Rotalia" translucens	VI-IX
Sphaeroidina bulloides	II
Textularia earlandi	I
Trochammina quadriloba	I, II
Uvigerina peregrina	II

Facies 4 is found in the various traverses as follows: traverse I, sta. 201, 203 (201-430 m.); traverse II, sta. 15, 23 (208-298 m.); traverse V, sta. 74, 99, 100 (204-530 m.); traverse VI, sta. 47-49 (183-446 m.); traverse VII, sta. 181-186 (186-347 m.); traverse VIII, sta. 151 (366 m.); traverse IX, sta. 140-142 (256-421 m.). The facies is not represented in traverses II, IV, X, XI.

Facies 5. 350-600 m. — 900-1000 m.

The deeper depth limit is well-defined, especially by the species having their shoalest occurrences at this point. These forms will be listed under facies 6. The species, with a few

exceptions, having their shoalest occurrence between the depths of 350 m. and 600 m. are as follows:

Astrononion tumidum (320 m.)
Bolivina sp. (420 m.)
Cibicides kullenbergi (600 m.)
C. rugosa (600 m.)
C. wuellerstorfi (450 m.)
Cyclammina spp. (380 m.)
Eponides polius (600 m.)
Osangularia cultur (400 m.)
Plectina apicularis (550 m. mostly)
Quinqueloculina sp. (600 m.)
Rectobolivina dimorpha (350 m.)
Tolypammina schaudinni (550 m.)
Virgulina tessellata (360 m.)

The following species have their deepest occurrence at 900-1000 m.:

Rosalina floridana
R. suezensis
Textularia earlandi
Uvigerina hispido-costata
U. parvula

The following species do not occur with a frequency greater than 1 per cent deeper than 900-1000 m.:

Bolivina minima
E. ordinaria
Chilostomella oolina
Sphaeroidina bulloides
Trifarina bradyi

Traverse I did not penetrate this facies. The indications are, however, that there is more uniformity from east to west in this facies than in the shoaler ones. The following species have a frequency greater than 10 per cent in the various traverses in facies 5:

	Traverse
Bolivina albatrossi	II, III
B. ordinaria	II, III, VI
Bulimina aculeata	III, V
B. alazanensis	V, VI, IX
Cassidulina carinata	III
C. subglobosa	VI-VIII, XI
Epistominella exigua	II, VI, VII, IX
"Rotalia" translucens	VI-VIII
Sphaeroidina bulloides	II
Trochammina cf. *japonica*	II
T. tasmanica	II
Uvigerina laevis	II
U. peregrina	V, VI, VIII, IX

This facies is represented in the various traverses as follows: traverse II, sta. 12-14, 24 (314-732 m.); traverse III, sta. 31, 32 (373-400 m.); traverse V, sta. 101 (914 m.); traverse VI, sta. 40-46 (555-960 m.); traverse VII, sta. 187-190 (457-878 m.); traverse VIII, sta. 149, 150 (585-914 m.); traverse IX, sta. 144 (914 m.); traverse XI, sta. 124 (914 m.). The facies is not represented in traverses I, IV, X.

Facies 6. 900-1000 m. — ?

There is no marked facies boundary deeper than 900-1000 m. in this area. Several species appear or drop out deeper, however, before the greatest depth represented by these samples is reached at 3283 m.

The species having their shoalest occurrence at 900-1000 m. are as follows:

Alveolophragmium ringens (mostly)
Ammobaculites sp. B.
Ammoscalaria tenuimargo
Epistominella decorata
Gaudryina flintii
Pullenia sp.
Siphotextularia curta
S. rolshauseni
Tolypammina schaudinni (mostly)
Trochammina globulosa

Species having their shoalest occurrence deeper than the above are as follows:

Bolivina pusilla (1300 m., a few exceptions shoaler)
Nonion pompilioides (2250 m.)
Quinqueloculina venusta (1800 m.)
Reophax distans delicatulus (1200 m.)
Virgulina advena (1250 m.)

The following species have their deepest occurrence between 1000 m. and 3000 m.:

Alveolophragmium ringens (2400 m.)
A. wiesneri (1700 m.)
Angulogerina jamaicensis (1700 m.)
Anomalinoides mexicana (1700 m.)
Astrononion tumidum (2600 m.)
Bolivina ordinaria (2200 m.)
Chilostomella oolina (2900 m.)
Cibicides corpulentus (1700 m.)
C. deprimus (2500 m.)
C. aff. *floridanus* (1700 m.)
C. protuberans (1800 m.)
C. rugosa (2700 m.)
"Discorbis" bulbosa (2200 m.)
Epistominella vitrea (2300 m.)
Eponides regularis (1900 m. mostly)
Gaudryina flintii (2300 m.) (confined to facies 6)
Hormosina sp. (1900 m.)
Nonion formosum (1800 m.)
Nonionella opima (2300 m.)
Nummoloculina irregularis (2500 m.)
Planulina ariminensis (2500 m.)
Rectobolivina dimorpha (1400 m.)
Robertina bradyi (2600 m.)
Robulus spp. (2200 m.)
Sigmoilina tenuis (1700 m.)
Siphotextularia curta (2700 m.)
Virgulina punctata (2500 m.)
V. tessellata (2200 m.)

Facies 6 is fairly uniform throughout the area. The following species occur with a frequency of greater than 10 per cent in the various traverses:

	Traverse
Bolivina albatrossi	III (1 sta.)
Bulimina aculeata	II, III (not deeper than 1500 m.)
B. alazanensis	X (not deeper than 1100 m.)
B. spicata	X (not deeper than 1000 m.)
Cassidulina subglobosa	VI, VIII-XI
Cibicides wuellerstorfi	II, VII-XI (deeper than 2400 m.)
Epistominella decorata	II, III, V-VII, IX, X (deeper than 1400 m.)
Eponides turgidus	II, III, V, VI
Glomospira charoides	X (1 sta.)
Höglundina elegans	IX, X (1 sta. each)
Reophax distans delicatulus	III (1 sta.)
Uvigerina peregrina	II, V, VI (not deeper than 1500 m.)
Virgulina tessellata	III (not deeper than 1500 m.)

This facies is represented in the various traverses as follows: traverse II, sta. 3-11 (914-3017 m.); traverse III, sta. 33-37 (1024-2388 m.); traverse V, sta. 102-105 (1097-1417 m.); traverse VI, sta. 38, 39, 106 (1144-2697 m.); traverse VII, sta. 191, 107 (2999-3017 m.); traverse VIII, sta. 146, 148 (1730-3164 m.); traverse IX, sta. 108, 137, 145 (2268-3072 m.); traverse X, all stations (1051-2150 m.); traverse XI, sta. 1, 2, 110-113, 120-123 (1326-3283 m.). The facies is not represented in traverses I and IV.

LATERAL CHANGES IN FAUNAS

A study of the species forming the bulk of the faunas in the various facies in each traverse shows very clearly that there is a lateral change in faunas in this area. The traverses off the Mississippi Delta contain faunas which differ from those on both sides. Such species as *Goësella mississippiensis* n. sp. and *Textularia earlandi* are restricted to this region. This is probably due to the outflow of the Mississippi River which would affect the turbidity, light penetration, food supply and the chemistry of the water and sediments. The salinity is not affected very

much except at the shoalest stations and probably is not a controlling factor.

Eastward from the Mississippi Delta there is an increase on the continental shelf and out to depths of 100-200 m. of West Indian species: *Asterigerina carinata,* various species of the Peneroplidae, *Amphistegina,* etc. These forms are well established as far west as traverse VI. They are not found in the northwestern Gulf of Mexico except on isloated reefs. A study of the Foraminifera in samples from the continental shelf east of the Mississippi Delta, which extends to a depth of about 75 m., shows that except for a few stations at the inner ends of the traverses the area is apparently non-depositional. The sediment is mostly gravel, sand, and shells and there is no material present which could produce turbid conditions. The sediment at the inner ends of traverses V-VIII usually is pure, coarse quartz sand. A large percentage of the Foraminifera in this non-depositional area is worn and discolored and many are filled with glauconite. The relative abundance, therefore, of such robust forms as *Amphistegina,* the Peneroplidae, Miliolidae, etc. may be due in part to their survival over long periods of time where other more delicate forms are not preserved. Short cores could not be obtained from this material and the samples were not treated with formalin to preserve the living forms. A study of these would give more definite information concerning the present-day fauna.

Although there are no samples from the continental shelf along the west coast of Florida, the few relatively shallow samples show a further increase of West Indian forms. Many of these occur so rarely that they have not been included in the population counts but a few of them are listed in a subsequent section.

It is interesting that although lateral differences in the shoaler facies are marked for the bulk of the population, the facies boundaries can be identified easily throughout the area, in many cases by the same species. In progressively deeper facies the lateral changes disappear to a great extent and deeper than 1000 m. the faunas are fairly uniform.

DISTRIBUTION OF LIVING BENTHONIC SPECIES

The living forms were studied in samples which were collected with the Phleger sampler (listed in Table 3). These extend over

most of the area except that shoaler than 75 m. in traverses V-VIII and the few shoal stations in traverses X and XI. The absence of data for these stations makes it impossible to give a complete picture of the occurrence of living specimens in the area but the data obtained are given in Tables 25-28 so that they may be on file for study when additional work may supplement them. These tables list numbers of specimens of each species found in 10 cc. of sediment, the surface area covered being about 5 sq. cm., half the surface area sampled.

Population counts of living Foraminifera were made of all the samples in traverses I-IV and some interesting results were obtained. Phleger (1951, p. 65) has pointed out that relative rates of sedimentation may be estimated by comparing numbers of living forms present relative to the dead population. A decrease in the relative numbers of living specimens would indicate a decrease in the sedimentation rate since the dead population would not be so rapidly masked by sedimentation. Living populations expressed as percentages of total population (living and dead) for traverses I-IV are listed in Table 2. There is evidence in a few of the shoaler samples of decalcification of some of the specimens possibly due to the increasing acidity of the samples after collection. This is detected by the presence of casts composed of stained protoplasm. In such cases the percentages of living populations given are probably higher than they should be.

A study of Table 2 shows that in traverse I the living population in percentage of total population ranges from 68 at 51 m. to 7 at 430 m.; in traverse II it ranges from 100 per cent at 33 m. to 0 per cent at 3017 m. Living populations fall to 4 per cent at 314 m. and are very low, usually less than 1 per cent, deeper. The sample containing 100 per cent living specimens showed evidence of decalcification. In traverse III the percentage is 83 at 22 m., varies from 2-11 to a depth of 1719 m., and drops below 1 at 2388 m. In traverse IV, with all stations at depths shoaler than 62 m., the percentages are less than 1 at the Mobile Bay end (with the exception of sta. 217 which shows anomalous characteristics), remaining so southward to sta. 215 which has 3, sta. 214, 5, sta. 213, 40, and sta. 212, 18 per cent. These figures bear out the fact that in the vicinity of the Mississippi Delta sedimentation is more rapid than in the area to the northeast or at the deeper

Traverse I			Traverse II			Traverse III			Traverse IV		
Sta.	Depth in Meters	% Living	Sta.	Depth in Meters	% Living	Sta.	Depth in Meters	% Living	Sta.	Depth in Meters	% Living
211	51	68	16	33	100	25	22	83	225	20	0.4
210	86?	18	17	58	25	26	53	2	224	20	0.5
209	86?	6	18	88	8	27	77	2	222	33	0.1
208	73	15	19	106	0.4	28	106	11	221	35	0.2
207	82	17	20	113	3	29	155	8	220	37	0.5
206	79	8	21	142	10	30	205	8	219	38	1
205	82	7	22	168	3	31	373	2	218	42	0.3
204	91	11	23	208	5	32	400	2	217	40	24
202	128	12	15	298	0.4	33	1024	2	216	42	0.2
203	201	6	24	314	4	34	1262	6	215	47	3
201	430	7	14	471	0	35	1481	6	214	49	5
			13	631	2	36	1719	2	213	55	40
			12	732	0.2	37	2388	0.3	212	62	18
			11	914	2						
			10	1298	0.3						
			9	1372	0.5						
			8	1417	1						
			7	1875	0.6						
			6	2468	0.2						
			5	2788	2						
			4	2972	0						
			3	3017	0						

Table 2. Living benthonic population, in percentage of total benthonic population, in traverses I-IV.

stations to the south. There are insufficient data to draw any further conclusions, but the inference is clear that with sufficient data much could be learned about sedimentation rates by this means.

To a depth of 200 m. most of the species present in significant frequencies have living representatives; deeper than this the representation by living forms is spasmodic and they usually form less than 1 per cent of the total population. The various species of *Reophax* are an exception to the general rule. They are usually represented by a relatively large number of living specimens. This is especially true of *R. hispidulus*. The relatively large number of living specimens of these species and the low frequency of dead specimens suggests that these forms usually

are destroyed soon after death. The tests of *R. hispidulus* are very fragile, the sand grains which form them being weakly cemented, so that once the supporting protoplasm is gone the specimens probably disintegrate rapidly. The same observation was made of such arenaceous species, in the shoal samples in the Mississippi Delta region, as *Goësella mississippiensis* n. sp., *Nouria polymorphinoides* and *Nouria* sp. Such fragile forms seldom appear in fossil assemblages and are probably not present in modern dead assemblages in the frequencies warranted by their actual rate of production.

DISTRIBUTION OF PLANKTONIC SPECIES (LIVING AND DEAD)

The relative distributions of the planktonic species are very similar throughout the area. Table 24 gives the percentage distributions in traverse VII and these may be taken, with some variation, as representative of the entire area. The total numbers of planktonic specimens in each sample are given in Tables 4-23. The species are not figured in the present report; the figures given by Phleger *et al* (1953) illustrate most of them and are accompanied by full taxonomic notes. The following species occur in the area:

Candeina nitida d'Orbigny
Globigerina bulloides d'Orbigny
G. digitata H. B. Brady
G. eggeri Rhumbler
G. inflata d'Orbigny
G. pachyderma (Ehrenberg)
G. sp.
Globigerinella aequilateralis (H. B. Brady)
Globigerinita glutinata (Egger)
Globigerinoides conglobata (H. B. Brady)
G. rubra (d'Orbigny)
G. sacculifera (H. B. Brady)
Globorotalia hirsuta (d'Orbigny) (4 occurrences)
G. menardii (d'Orbigny)
G. punctulata (d'Orbigny)
G. scitula (H. B. Brady)
G. truncatulinoides (d'Orbigny)
G. tumida (H. B. Brady)
Hastigerina pelagica (d'Orbigny)
Orbulina universa d'Orbigny
Pulleniatina obliquiloculata (Parker and Jones)
Sphaeroidinella dehiscens (Parker and Jones)

The species listed as *Globigerina* sp. is a small form with a maximum diameter of 0.25 mm. It is apparently identical to that referred by Rhumbler (1911, pl. 30, figs. 1-6) to *G. lamellosa*

Terquem. It is probably not this Eocene species which is later referred by Le Calvez (1949, p. 17) to "*Discorbis propinqua*" (Terquem). *Globigerina* sp. has a thin supplementary chamber extending from the dorsal side between the last-formed chamber and the first one in the last-formed whorl, to varying degrees over the umbilicus. There are supplementary apertures along the sides of this chamber which in many respects is similar to the supplementary chambers of *Globigerinita*. This chamber is apparently resorbed or destroyed when new regular chambers are added since there is no trace of previous ones. The species in other respects resembles a *Globigerina* of the *G. quinqueloba* Natland type. It is probable that it represents a new genus.

Globigerinita glutinata occurs in the area in some abundance. A re-examination of samples from the northwestern Gulf of Mexico shows that it is present there also although it is not reported by Phleger and Parker (1951).

The planktonic species appearing in the highest frequencies are (in order of abundance):

Globigerinoides rubra
Globigerina bulloides
G. eggeri
Globigerinoides sacculifera
Globorotalia truncatulinoides
G. menardii
Pulleniatina obliquiloculata
Globigerinita glutinata
Globigerinella aequilateralis

This assemblage of high-frequency species combines elements typical of both mid- and low-latitude faunas in the North Atlantic (Phleger *et al*, 1953). *Globigerina bulloides* and *Globorotalia truncatulinoides* are present in higher frequencies than they appeared in North Atlantic low latitudes although they are not quite so high as in the mid-latitudes. Conversely, *Globigerina eggeri*, *Globigerinoides sacculifera* and *Globorotalia menardii* are present in higher frequencies than they appeared in mid-latitudes but not so high as in the low. *Pulleniatina obliquiloculata* is present at frequencies characteristic of low latitudes. The remaining species are not diagnostic.

Of the rarer species, *Globigerina inflata* and *G. pachyderma* are diagnostic of mid-latitudes. *Globorotalia scitula* is present at mid-latitude frequencies. *G. tumida* is present at somewhat higher frequencies than are typical of mid-latitudes but less than those of low latitudes.

As stated previously, surface temperatures in the Gulf of Mexico range from an average minimum of 20°C. in February to an average maximum of 29°C. in August. The average maximum of 29°C. is higher than any found in the North Atlantic, except locally, even in the equatorial region. The minimum of 20°C. is comparable to that found between N Lat. 30° and 35° in the North Atlantic. There, the average maximum temperatures range from 26.5-27.5°C. In respect to temperature, then, the Gulf of Mexico combines the minimum of the North Atlantic mid-latitudes with a maximum in excess of that found in North Atlantic low latitudes. This may in part explain the anomalies of the planktonic assemblage found in the eastern Gulf of Mexico.

It is easy to explain the introduction of planktonic species which occur in low latitudes into the Gulf of Mexico by the surface current flowing north from the Caribbean Sea. The presence of *Globigerina inflata* and *G. pachyderma* (and possibly *Globorotalia hirsuta*, *G. punctulata* and *G. scitula*) are more difficult to explain since they apparently do not occur in the Caribbean nor are they found in the western part of the Gulf of Mexico. It is postulated that these species may be introduced from the Atlantic by a shallow coastal current flowing from east to west along the Florida coast. R. C. Reid (personal communication) says that it is very possible that such a current exists and that the conformation of the Florida Keys strongly suggests it. The circulation in the gulf itself being divided into two main eddies in the eastern and western parts probably would explain why *Globigerina inflata* and *G. pachyderma*, which are rare, appear only in the eastern Gulf of Mexico area.

The total number of planktonic specimens in the samples is very variable. In the Mississippi Delta region they do not occur in the sediments as shoal as in the rest of the area and are almost completely absent in traverse I to a depth of 430 m. In traverse II they occur at 88 m. but not significantly until considerably deeper and in traverses III-VIII in small numbers shoaler than 50 m. Their absence in the delta region is probably due to the outflow of the Mississippi River which causes water to flow out over the surface for long distances. Throughout the area samples taken at less than 100 m. usually contain planktonic specimens at less than 10 per cent of total population. Deeper than 1000 m.

they usually compose 90 per cent or more of the total population.

Deeper than about 150 m. the planktonic specimens at many stations show evidence of solution of the tests. This is shown especially by the large number of broken specimens. At some stations at least 50 per cent of the fauna appears to be affected. Since it is unknown how rapidly fresh tests are added, it is impossible to tell how rapidly solution takes place. The relatively small number of fresh specimens at some deep-water localities suggests that solution is fairly rapid.

Tables 29 and 30 list the number of living specimens of planktonic species found at the various stations. Since protoplasm is rapidly destroyed after death, probably not remaining in the test more than 12-14 hours, the specimens very likely represent actual living forms which for some reason have fallen to the bottom and survived. There are more living representatives of the abundant species than the rare ones. This implies that the living forms do not necessarily represent selected species which may have benthonic stages. Such rare species as *Globigerina inflata*, *Globigerinoides conglobata*, *Sphaeroidinella dehiscens*, etc. have no living representatives.

BENTHONIC SPECIES

Introduction

Two hundred and five benthonic species and thirteen generic or family groups have been used in compiling the data of the present report, including ten new species and one new genus. These constitute only a part of the fauna but are a large proportion of the total population. The remainder of the fauna is present in small quantities and for the most part the species have no distributional significance. Some of the species in this group which appear to have limited depth ranges are:

	Depth	Traverse
Buliminella elegantissima (d'Orbigny)	to 140 m.	IV-VIII
Cassidulina norcrossi australis Phleger & Parker	140-585 m.	VI-VIII
C. palmerae Bermudez and Acosta	135-255 m.	IX-XI
Cassidulinoides bradyi (Norman)	140-375 m.	scattered

	Depth	Traverse
Chrysalidinella sp.	to 155 m.	scattered
Cornuspira planorbis Schultze	to 185 m. (mostly)	scattered
Dorothia caribaea Cushman	140-155 m.	VI, VII, XI
Ehrenbergina undulata Parker	320-450 m. (mostly)	VI-X
Gaudryina antillana Bermudez and Acosta	85-180 m.	VI-IX
Patellina corrugata Williamson	to 240 m. (mostly) rare to 1300 m.	scattered
Siphotextularia subplana (Cushman)	115-255 m.	scattered
Stomatorbina concentrica (Parker and Jones)	55-185 m.	VI-IX, XI
Textularia mexicana Cushman	135-370 m.	VI-VIII
Uvigerina sp. (hirsute with undercut chambers)	deeper than 1550 m.	VI, IX-XI

There has been little previous work in this area. Flint (1899) and Cushman (1918-1931) report on samples collected by the U. S. Bureau of Fisheries ship ALBATROSS. Most of this material is from deep water stations. Lowman (1949, 1951) gives data on the distribution of genera off Pensacola and Choctawhatchee Bay, Florida.

About 75 per cent of the present fauna is reported by Phleger and Parker (1951) in the northwestern Gulf of Mexico. About 15 per cent of the species reported by them are not present or occur only rarely in the eastern area. There is an increase east of Mobile Bay in the number of species characteristic of the West Indian region, but many of the West Indian species found on the isolated reefs of the northwestern Gulf of Mexico are not present in the northeastern. It is possible that they may be found in shallow areas along the Florida coast not included in this report since many of them are reported from the Tortugas region by Cushman (1922). A few deep-water species characteristic of the North Atlantic, such as *Cibicides kullenbergi* and *Bolivina pusilla,* occur in the northeastern area but not in the northwestern.

Under each species details of depth and areal distribution are given. Cushman's classification is used for convenience although the writer is not in complete agreement with it. Figured specimens are deposited in the U. S. National Museum, Washington, D. C.

Discussion of Species

Family SACCAMMINIDAE

Under "Saccamminidae and related forms" in the population counts are included various single-chambered forms which could not be readily differentiated in counting. Probably included here are specimens of *Reophax* and *Hormosina* represented by single chambers. The group is included in the counts because in some cases it forms a large component of the fauna.

These forms have an overall depth range from 125 m. to 2700 m. In traverse II they occur with frequencies of 5-20 per cent from 140 m. to 170 m.; 1-5 per cent to a depth of 1400 m. In the remaining traverses the occurrence is scattered.

Proteonina atlantica Cushman

(Plate 1, figure 1)

Proteonina atlantica Cushman, 1944, Spec. Publ. 12, Cushman Lab. Foram. Res., p. 5, pl. 1, fig. 4.

This species was combined with the following one by Phleger and Parker (1951). As I have previously pointed out (Parker, 1952, p. 393) the two species are very distinct.

P. atlantica has a scattered occurrence in traverses II, IV-VII, usually less than 1 per cent. In traverse IV it occurs with a frequency of 20 per cent and 48 per cent at two stations shoaler than 60 m. These two stations, however, showed a relatively small arenaceous fauna in which calcareous forms may have been destroyed by decalcification. Most occurrences are shoaler than 500 m. but there are a few between 1000 and 3000 m., mostly with frequencies between 1-5 per cent.

Proteonina difflugiformis (H. B. Brady)

(Plate 1, figure 2)

Reophax difflugiformis H. B. Brady, 1879, Quart. Journ. Micr. Sci., vol. 19, p. 51, pl. 4, figs. 3a, b.

This species occurs in all traverses except IV. It is found at all depths. Frequencies of 6-10 per cent are found in traverse I from 70-200 m., and in traverse II from 1450-1700 m.; elsewhere they are less than 6 per cent.

Family REOPHACIDAE

Reophax bilocularis Flint

(Plate 1, figure 3)

Reophax bilocularis Flint, 1899, Rept. U. S. Nat. Mus., (1897), p. 273, pl. 17, fig. 2.

Three-chambered specimens occur frequently but the third chamber is relatively very small.

This species occurs in all traverses except I and IV, in most cases with a frequency of less than 1 per cent. In traverses II, III, V, it occurs deeper than 1000 m.; in VI-XI deeper than 320 m.

Reophax distans delicatulus Cushman

(Plate 1, figure 4)

Reophax distans H. B. Brady, var. *delicatulus* Cushman, 1920, Bull. U. S. Nat. Mus., vol. 104, pt. 2, p. 13, pl. 4, fig. 2.

Cushman's figured specimen has a length (exclusive of the connecting necks) of 0.33 mm. but the maximum length of specimens found in the present study is 0.65 mm. Due to the fragility of the necks only single chambers occur. It is possible that small specimens without necks have been included in the population counts under Saccamminidae, etc. so that the distribution given below may not show the complete occurrence of the species.

The species occurs in all traverses but I and IV deeper than 1200 m., at less than 6 per cent except at the outer ends of traverses II and III where it is 6 per cent and 12 per cent respectively.

Reophax gracilis (Kiaer)

Nodulina gracilis Kiaer, 1900, Rep't. Norwegian Fish Mar. Invest., vol. 1, no. 7, p. 24, text fig. 2 (1?).

This species occurs at 5 stations in traverses I, II, and IV between 47 m. and 430 m. Only living specimens were found. The fragility of the test makes survival in dried samples very unlikely.

Reophax guttifera H. B. Brady

(Plate 1, figure 5)

Reophax guttifera H. B. Brady, 1881, Quart. Journ. Micr. Sci., vol. 21, p. 49; 1884, Rept. Voy. CHALLENGER, Zool., vol. 9, p. 295, pl. 31, figs. 10-15.

This species has a scattered occurrence mostly at less than 1 per cent except in traverse II where it varies between 1 and 3 per cent from 300 m. to 914 m.

Reophax hispidulus Cushman

(Plate 1, figures 6, 7)

Reophax hispidulus Cushman, 1920, Bull. U. S. Nat. Mus., vol. 104, pt. 2, p. 24, pl. 5, fig. 7.

The specimens appear to be identical with Cushman's species although they are less than 1 mm. in length whereas Cushman's exceed 3 mm. in length. Judging from the relatively large number of living specimens found, and the extreme fragility of the tests, it is probable that the figures shown in the total population counts are much lower than they should be. Very often living specimens are found when there are no empty tests in the dried samples.

The species occurs in all traverses but IV and IX, with frequencies ranging up to 3 per cent, at 45-3250 m.

Reophax irregularis n. sp.

(Plate 1, figures 9, 10)

Test medium in size; chambers not more than five in number, usually less, the initial one spherical, the remaining ones compressed with adjacent ones frequently set at an angle to each other, increasing in size as added; sutures depressed, often obscured by large fragments of wall material; wall rough, composed of sand grains, fragments of shell, etc. of varying sizes very irregularly cemented together. Maximum length of paratypes 1.7 mm.; width 0.6 mm. (not including projecting wall fragments).

Holotype from station 59, Lat. 29°58′ N, Long. 86°37′ W, at a depth of 91 m.

This species somewhat resembles *R. nothi* McFadyen but the wall of the test is much more irregular, the chambers do not increase so rapidly in size as added, and adjacent ones are often irregularly placed.

It occurs in traverses V-IX, XI, at depths of less than 185 m. except in IX where it is found to a depth of 255 m. Frequencies are below 6 per cent.

Reophax scorpiurus Montfort

(Plate 1, figure 11)

Reophax scorpiurus Montfort, 1808, Conch. Syst. Class. Meth. Coqu., p. 331, text fig. (p. 330).

This species occurs mostly in traverses I-III, with irregular occurrences elsewhere, to a depth of 400 m. Most deeper occurrences are at depths greater than 2600 m. Frequencies are less than 1 per cent except in traverses I and II where they range up to 5 per cent with one occurrence of 10 per cent at 208 m.

Reophax sp.

(Plate 1, figure 12)

This species is present in the form of isolated single chambers due apparently to weakness at the point of joining of the chambers. The maximum length of these chambers is 1.23 mm., width 0.2 mm. They are flask-shaped with the widest point below the middle.

Most occurrences are in traverse II from 315 m. to 735 m. Frequencies are below 6 per cent except for one occurrence of 10 per cent at 208 m.

Hormosina sp.

(Plate 1, figure 8)

This species occurs in traverses I-III, V-VII with frequencies of less than 1 per cent from 215-300 m. and 1750-1850 m. Frequencies are 1-5 per cent between 300 m. and 1750 m. There is one occurrence of 11 per cent in traverse I at 430 m.

Family AMMODISCIDAE

Ammodiscus spp.

Species of this genus are grouped together owing to the lack of sufficient material for their proper analysis. Specimens occur in all traverses except IV usually with a frequency of less than 1 per cent, except in I where frequencies of 1-5 per cent are found at 128 m. and 201 m.

Glomospira charoides (Jones and Parker)

(Plate 1, figure 14)

Trochammina squamata var. *charoides* Jones and Parker, 1860, Quart. Journ. Geol. Soc. London, vol. 16, p. 304.

This species occurs in all traverses but IV deeper than 130 m. at frequencies of less than 6 per cent in most cases. Higher frequencies up to 10 per cent occur in some areas deeper than 900 m.

Glomospira cf. gordialis (Jones and Parker)

(Plate 1, figure 13)

Trochammina squamata var. *gordialis* Jones and Parker, 1860, Quart. Journ. Geol. Soc. London, vol. 16, p. 304.

Trochammina gordialis Jones and Parker, Carpenter, Parker and Jones, 1862, Introd. Form. p. 141, pl. 11, fig. 4.

The specimens have a smooth, polished test and are questionably comparable to Jones and Parker's species.

The species has a scattered occurrence in the whole area deeper than 140 m. Frequencies are usually less than 1 per cent, occasionally higher.

Tolypammina schaudinni Rhumbler

(Plate 1, figure 15)

Tolypammina schaudinni Rhumbler, 1904, Archiv. Prot., vol. 3, pt. 1, p. 277, text fig. 126 (on p. 278).

Most occurrences are deeper than 914 m. with frequencies less than 6 per cent, in traverses II, III, VII-XI.

Family LITUOLIDAE

Haplophragmoides bradyi (Robertson)
(Plate 1, figure 16)

Trochammina robertsoni H. B. Brady, 1887 (not *T. robertsoni* H. B. Brady, 1876), Journ. Roy. Micr. Soc., p. 893.

Trochammina bradyi Robertson, 1891, Ann. Mag. Nat. Hist., ser. 6, vol. 7, p. 388.

This species is found in all traverses except IV, with two exceptions deeper than 165 m. Frequencies are less than 1 per cent in most of the area but may be as high as 5 per cent deeper than 630 m.

Adercotryma glomeratum (H. B. Brady)
(Plate 1, figure 18)

Lituola glomerata H. B. Brady, 1878, Ann. Mag. Nat. Hist., ser. 5, vol. 1, p. 433, pl. 20, figs. 1a-c.

Most specimens are larger and composed of coarser sand grains than those from the Gulf of Maine and the Arctic; in other respects they seem identical.

The species occurs in all traverses except IV with a scattered occurrence from 200-1000 m., and a more consistent distribution deeper. Frequencies are less than 1 per cent to 1000 m. and 1-5 per cent, in most cases, deeper.

Alveolophragmium nitidum (Goës)
(Plate 1, figure 17)

Haplophragmium nitidum Goës, 1896, Bull. Mus. Comp. Zool., vol. 29, p. 30, pl. 3, figs. 8, 9.

The writer is following the opinion given by Loeblich and Tappan (1953, p. 28) in the use of the name *Alveolophragmium* for the genus having an interio-areal aperture which is undivided and forms a lineal slit. Many specimens of various species of this genus have been observed but in none of them has the aperture been subdivided. It would appear, therefore, that the divided aperture is restricted in its occurrence and is probably a true generic feature, giving separate status to the genus *Cribrostomoides*.

A. nitidum is found in all traverses but IV, in most cases deeper than 300 m. Frequencies are usually less than 1 per cent but occasionally 1-5 per cent.

Alveolophragmium ringens (H. B. Brady)
(Plate 1, figure 19)

Trochammina ringens H. B. Brady, 1879, Quart. Journ. Micr. Sci., n.s., vol. 19, p. 57, pl. 5, fig. 12

This species is more involute than others of this genus and the aperture is placed farther from the chamber margin, but in essentials it appears to be referable to *Alveolophragmium*.

Occurrences are scattered, mostly deeper than 1200 m., with frequencies of less than 1 per cent.

Alveolophragmium scitulum (H. B. Brady)
(Plate 1, figures 20, 21)

Haplophragmium scitulum H. B. Brady, 1881, Quart. Journ. Micr. Sci., vol. 21, p. 50; 1884, Rept. Voy. CHALLENGER, Zool., vol. 9, p. 308, pl. 34, figs. 11-13.

Gulf of Mexico specimens have an interio-areal aperture and this feature is also plainly visible in the section figured by Brady (fig. 13). Adult specimens are rare.

The species has a scattered distribution from 90-2950 m. usually at less than 1 per cent, occasionally higher.

Alveolophragmium subglobosum (G. O. Sars)
(Plate 2, figures 1, 2)

Lituola subglobosa M. Sars, 1868 (1869), Forh. Vid. Selsk. Christiania, p. 250 (nomen nudum); G. O. Sars, 1872, *ibid.*, p. 253.

Haplophragmium latidorsatum H. B. Brady, 1884 (not *Nonionina latidorsatum* Bornemann, 1885), Rept. Voy. CHALLENGER, Zool. vol. 9, p. 307, pl. 34, figs. 7, 8, 10, 14 (?) (not fig. 9).

Haplophragmoides subglobosum (G. O. Sars) Cushman, 1910, Bull. U. S. Nat. Mus., vol. 71, pt. 2, p. 105, text figs. 162-164.

Juvenile specimens are more irregularly coiled than are the adults. The species appears to be intermediate between *Recurvoides* and *Alveolophragmium* but is more closely allied to the latter in adult specimens.

The distribution is very scattered deeper than 300 m. with most occurrences deeper than 900 m. Frequencies are in most cases less than 1 per cent.

Alveolophragmium wiesneri (Parr)
(Plate 1, figure 23)

Labrospira wiesneri Parr, 1950, B. A. N. Z., Antarctic Res. Exped., 1929-1931, Repts., ser. B, vol. 5, pt. 6, p. 272, pl. 4, figs. 25, 26.

Labrospira arctica Parker, 1952, Bull. Mus. Comp. Zool., vol. 106, no. 9, p. 399, pl. 2, figs. 7, 12.

This species has a very scattered distribution, in most cases 625-1750 m. Frequencies are less than 1 per cent except in traverses II deeper than 620 m. and III deeper than 1000 m. where they range from 1-6 per cent.

Alveolophragmium sp.
(Plate 1, figure 22)

This species is referred to *Labrospira* sp. by Phleger and Parker (1951, p. 3). It is possible that there are two species combined here as the distribution is divided. One group is found at less than 200 m. at frequencies of less than 1 per cent, except in traverse I where they range up to 14 per cent. A second group occurs deeper than 960 m. mostly at less than 1 per cent.

Ammoscalaria pseudospiralis (Williamson)
(Plate 2, figures 3, 4)

Proteonina pseudospirale Williamson, 1858, Rec. Foram. Great Britain, p. 2, pl. 1, figs. 2, 3.

Ammobaculites prostomum Hofker, 1932, Publ. Staz. Zool. Napoli, vol. 12, fasc. 1, p. 87, figs. 14, 15.

Two variant forms are included in this species. One appears to be identical to that figured by Williamson and perhaps more accurately by Brady (1884, pl. 33, figs. 1-4). The second form, found in the vicinity of the Mississippi Delta, is smaller, longer in relation to breadth, and more finely arenaceous. The two forms are sometimes found together, but the typical form is much more widespread. A detailed study of the distribution of the small form in the Mississippi Delta area would be needed to determine whether or not this is a variant form related to a specialized environment or whether it is a different species altogether. In most respects the forms are very similar.

The species occurs in traverses I-VIII from 20-210 m. Frequencies vary from less than 1 per cent to 30 per cent in traverses I, II, IV and are less than 1 per cent elsewhere.

Ammoscalaria tenuimargo (H. B. Brady)

(Plate 2, figure 5)

Haplophragmium tenuimargo H. B. Brady, 1882, Proc. Roy. Soc. Edinburgh, vol. 11, (1880-82), p. 715; 1884, Rept. Voy. CHALLENGER, Zool., vol. 9, p. 303, pl. 33, figs. 13-16.

The specimens are smaller than those described by Brady, being less than 1 mm. in length. The ratio of breadth to length is slightly larger.

The distribution is scattered in traverses II, V, VII-XI deeper than 950 m. Frequencies are less than 6 per cent.

Ammobaculites sp. A.

(Plate 2, figures 7, 8)

The specimens are very fragile, and very few are found in any one sample. It is probable that the tests are not preserved in the sediment very long after death. The species most closely resembles *A. americanus* Cushman and *A. rostratus* Heron-Allen and Earland but is not umbilicate.

A. sp. A occurs in traverses I-III, V at frequencies of less than 6 per cent except for one occurrence of 8 per cent in I at 201 m.

Ammobaculites sp. B.

(Plate 2, figure 6)

This species is apparently new but is not found at any one station in sufficient quantities to so describe it. It has a maximum length of 0.3 mm. and a maximum width in the coiled portion of 0.11 mm. The test is circular in cross section and has a smooth, polished, finely arenaceous wall.

It is found in all traverses except I and IV deeper than 820 m., with most occurrences deeper than 950 m. Frequencies are less than 6 per cent.

Cyclammina spp.

This genus has a very scattered distribution deeper than 475 m. in most cases with frequencies of less than 1 per cent.

Family TEXTULARIIDAE

Spiroplectammina floridana (Cushman)
(Plate 2, figure 9)

Textularia floridana Cushman, 1922, Publ. 311, Carnegie Instit. Washington, vol. 17, p. 24, pl. 1, fig. 7.

This is believed to be a valid species for the reasons given by Phleger and Parker (1951, p. 4).

It is found in traverses V-IX, XI at frequencies of less than 1 per cent, occasionally as high as 2 per cent in VI and VIII.

Textularia candeiana d'Orbigny
(Plate 2, figures 16, 17)

Textularia candeiana d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminifères," p. 143, pl. 1, figs. 25-27.

Associated with typical *T. candeiana* are smaller specimens in which the chambers do not increase so rapidly in size as added. The two forms appear to grade into one another and are considered to belong to the same species.

There is one occurrence in traverse IV; consistent distribution is in traverses V-IX, XI to a depth of 345 m. Frequencies are less than 5 per cent.

Textularia conica d'Orbigny
(Plate 2, figure 13)

Textularia conica d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminifères," p. 143, pl. 1, figs. 19, 20.

Specimens of this species vary greatly in the amount of compression of the tests so that some in apertural view are almost completely circular while others are relatively narrow. All variations between the two extremes are observed.

The species occurs in traverses V-IX, XI down to a depth of 280 m. with frequencies of 2 per cent or less.

Textularia earlandi Parker
(Plate 2, figure 12)

Textularia elegans Lacroix, 1932 (not *Plecanium elegans* Hantken, 1868), Bull. Instit. Ocean. Monaco, no. 591, p. 8, text figs. 4, 6.

Textularia tenuissima Earland, 1933 (not Hausler, 1881), DISCOVERY Repts., vol. 7, p. 95, pl. 3, figs. 21-30.

Textularia earlandi Parker, 1952, Bull. Mus. Comp. Zool., vol. 106, no. 10, p. 458 (footnote).

This species occurs in traverses I-V, to a depth of 1000 m. Frequencies are variable with a maximum of 79 per cent in I at station 210 and in IV at station 212. Frequencies higher than 30 per cent only occur shoaler than 80 m.

Textularia foliacea occidentalis Cushman

(Plate 2, figure 10)

Textularia foliacea Heron-Allen and Earland var. *occidentalis* Cushman, 1922, Bull. U. S. Nat. Mus., vol. 104,, pt. 3, p. 16, pl. 2, figs. 13.

It is possible that Cushman's variety should be raised to specific rank, but this cannot be done without a study of type material. It is here given subspecific rank since the two forms are so widely separated geographically. A related form occurs rarely in this area which varies in being much less compressed. It sometimes occurs with the typical form and sometimes elsewhere. It is omitted from the population counts due to its rarity, but is found in traverses IX and XI, to a depth of 520 m.

T. foliacea occidentalis occurs in traverses V-IX, XI from 65 m. to 255 m. at frequencies of usually less than 1 per cent, occasionally slightly higher.

Textularia mayori Cushman

(Plate 2, figure 11)

Textularia mayori Cushman, 1922, Publ 311, Carnegie Instit. Washington, vol. 17, p. 23, pl. 2, fig. 3.

This species occurs in traverses IV-IX, XI to a depth of 150 m. with some deeper occurrences in VI and IX to a depth of 255 m. Frequencies up to 6 per cent occur shoaler than 70 m.; deeper, they are less than 1 per cent.

Siphotextularia curta (Cushman)

(Plate 2, figure 15)

Textularia flintii var. *curta* Cushman, 1922, Bull. U. S. Nat. Mus., vol. 104, pt. 3, p. 14, pl. 2, figs. 2, 3.

This species occurs in traverses III, V, VI, VIII-XI from 900 m. to 2650 m. with frequencies of less than 1 per cent.

Siphotextularia rolshauseni Phleger and Parker
(Plate 2, figure 14)

Siphotextularia rolshauseni Phleger and Parker, 1951, Mem. 46, Geol. Soc. America, pt. 2, p. 4, pl. 1, figs. 23, 24a, b.

This is a deep-water species occurring in traverses II, V-VIII, X, XI deeper than 2100 m. In most cases frequencies are less than 1 per cent.

Bigenerina irregularis Phleger and Parker
(Plate 3, figures 1, 2, 3)

Bigenerina irregularis Phleger and Parker, 1951, Mem. 46, Geol. Soc. America, pt. 2, p. 4, pl. 1, figs. 16-21.

This species differs from the following one in its less compressed biserial portion and smaller size. The test may be formed of calcareous fragments or sand grains depending on the materials available. Associated with this species in traverses VI-VIII is a variant form which is very slender and has a very small, more compressed biserial portion. This variant may be mistaken for a *Reophax* on superficial examination. It has a maximum length of 1.5 mm.

B. irregularis occurs in traverses IV-IX to a depth of 185 m. At less than 100 m. depth frequencies up to 5 per cent are found; deeper they are less than 1 per cent.

Bigenerina textularioidea (Goës)
(Plate 3, figures 4, 5)

Clavulina textularioidea Goës, 1894, Kongl. Svensk. Vet.-Akad. Handl., vol. 25, no. 9, p. 41, pl. 8, figs. 387-399.

This species is not reported in the northwestern Gulf of Mexico. Like the previous one the test may be formed of any material available.

It occurs in traverses V-IX, XI to a depth of 190 m. Frequencies may be as high as 6 per cent except in traverse VIII where they reach a maximum of 9 per cent.

Family VERNEUILINIDAE

Gaudryina cf. aequa Cushman
(Plate 3, figure 12)

Gaudryina aequa Cushman, 1947, Contr. Cushman Lab. Foram. Res., vol. 23, pt. 4, p. 87, pl. 18, figs. 18-21.

This species occurs in traverses V-VIII, XI to a depth of 150 m. at frequencies of less than 1 per cent.

GAUDRYINA (PSEUDOGAUDRYINA) ATLANTICA (Bailey)
(Plate 3, figure 7)

Textularia atlantica Bailey, 1851, Smithsonian Contr., vol. 2, art. 3, p. 12, pl., figs. 38-43.

This species occurs in traverses II (once), VI-IX, XI from 85 m. to 320 m. with frequencies of less than 1 per cent.

GAUDRYINA FLINTII Cushman
(Plate 3, figure 6)

Gaudryina subrotundata Flint, 1899 (not Schwager, 1866), Ann. Rept. U. S. Nat. Mus., (1897), p. 287, pl. 33, fig. 1.

Gaudryina flintii Cushman, 1911, Bull. U. S. Nat. Mus., vol. 71, pt. 2, p. 63, text fig. 102.

Specimens have a maximum length of 2 mm. and most have a shorter biserial stage than those figured by Cushman and Flint.

This species occurs in traverses VI-XI from 900 m. to 2250 m. Frequencies are not over 1 per cent.

GAUDRYINA cf. MINUTA Earland
(Plate 3, figures 15, 16)

Gaudryina minuta Earland, 1939, DISCOVERY Repts., vol. 10, p. 121, pl. 5, figs. 45, 46.

The specimens are larger and more elongate than *G. exilis* Cushman and Bronnimann and in some cases reach a greater length than that given by Earland for his species. The maximum length is 0.4 mm.

The distribution is scattered in traverses II-VIII to a depth of 1800 m. Frequencies are less than 1 per cent except in II where they reach a maximum of 8 per cent.

PSEUDOCLAVULINA MEXICANA (Cushman)
(Plate 3, figure 8)

Clavulina humilis H. B. Brady var. *mexicana* Cushman, 1922, Bull. U. S. Nat. Mus., vol. 104, pt. 3, p. 83, pl. 16, figs. 1-3.

This species has a scattered distribution in all traverses but I-IV from 80 m. to 455 m., with frequencies of less than 1 per cent.

Pseudoclavulina aff. novangliae Cushman
(Plate 3, figures 9, 10)

Clavulina nodosaria d'Orbigny var. *novangliae* Cushman, 1922, Bull. U. S. Nat. Mus., vol. 104, pt. 3, p. 82, pl. 15, figs. 3-5.

This is probably a new subspecies of Cushman's species but there is insufficient material from any one locality to make a statistical analysis. The Gulf of Mexico form has a maximum length of 2 mm. and width of 0.4 mm. It appears to be a somewhat smaller form, relatively more slender, the initial triserial portion being smaller in relation to the remainder of the test. In other respects the two are similar.

This form occurs in traverses VI-IX, from 115 m. to 370 m. Frequencies are less than 1 per cent.

Family VALVULINIDAE

Eggerella bradyi (Cushman)
(Plate 3, figure 17)

Verneuilina pygmaea H. B. Brady 1884 (not *Bulimina pygmaea* Egger 1857), Rept. Voy. CHALLENGER, Zool., vol. 9, p. 385, pl. 47, figs. 4-7.

Verneuilina bradyi Cushman, 1911, Bull. U. S. Nat. Mus., vol. 71, pt. 2, p. 54, text figs. 87a, b.

As pointed out by Phleger *et al* (1953, p. 27) this species sometimes develops a biserial stage. Such specimens occur very rarely in this area.

The species occurs in all traverses but I and IV, deeper than 150 m. in a few cases but chiefly deeper than 420 m. Frequencies are less than 1 per cent shoaler than 915 m.; deeper they may be as high as 5 per cent.

Textulariella spp.

Many of the specimens are probably referable to *T. barrettii* (Jones and Parker). Whether or not the low-spired, rapidly accelerated specimens which are found should be referred also to this species is open to question. Since the various forms have similar distributions, no attempt has been made to separate them in the population counts.

The group occurs in traverses V-IX, XI to a depth of 180 m. except in IX where they continue to 320 m. Frequencies are variable with a maximum of 3 per cent.

Plectina apicularis (Cushman)
(Plate 3, figure 18)

Gaudryina apicularis Cushman, 1911, Bull. U. S. Nat. Mus., vol. 71, pt. 2, p. 69, text figs. 110a, b.

This species occurs in all traverses but I and IV. There is a very scattered occurrence of less than 1 per cent frequency between 230 m. and 915 m.; deeper, the occurrences are more consistent and frequencies are often 1-5 per cent.

Goëselella mississippiensis n. sp.
(Plate 3, figures 13, 14, 19)

Test of medium size, the greatest width at the apex of the triserial portion of the test which with the multiserial portion composes about five-eighths of the adult test, all stages of development being greatly accelerated, with the uniserial portion in the adult usually only consisting of a single chamber; chambers distinct, inflated; sutures slightly depressed; wall smooth, composed of rather small sand grains of varying size; aperture round or elliptical. Maximum length 0.72 mm., width 0.32 mm.

Holotype from station 28, Lat. 29°24.5′ N; Long. 88°52′ W at a depth of 106 m.

This species is smaller than *G. flintii* Cushman, has a much smoother wall composed of fine arenaceous material. The general shape of the test in the two species is very similar except that I have never seen *G. mississippiensis* with more than one uniserial chamber. Many of the specimens are juvenile, having reached only the triserial stage.

The species occurs in traverses I-IV, V (once) in most cases shoaler than 210 m. Frequencies are very high: up to 44 per cent in I, 92 per cent in II, and somewhat lower in the remaining traverses.

Karreriella bradyi (Cushman)
(Plate 3, figure 11)

Gaudryina bradyi Cushman, 1911, Bull. U. S. Nat. Mus., vol. 71, pt. 2, p. 67, text figs. 107a-c.

This species occurs chiefly in traverses VI-XI deeper than 135 m. In traverses II, III, V there are a few occurrences deeper than 900 m. All frequencies are less than 1 per cent.

Liebusella spp.

There is not sufficient material to make a study of the various species. They occur in traverse V (once), VI-IX, XI from 70 m. to 275 m. with frequencies of less than 1 per cent.

Family MILIOLIDAE

Under Miliolidae in the population counts are grouped various species which are not sufficiently common to be considered separately. Taken together they form a large group which occurs chiefly in traverses IV-XI with the majority of occurrences shoaler than 500 m. Some or all occurrences deeper than 1300 m. probably represent displaced specimens. The highest frequencies are found shoaler than 150 m., ranging in a few cases as high as 42 per cent, most frequently between 5 and 20 per cent. The frequencies decrease to less than 1 per cent at 250 m. A few occurrences deeper than 1300 m. exceed 1 per cent.

Quinqueloculina bicostata d'Orbigny

(Plate 4, figures 1, 2)

Quinqueloculina bicostata d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminifères," p. 195, pl. 12, figs. 8-10.

Gulf of Mexico specimens are larger than d'Orbigny's, reaching a maximum length of 0.9 mm.

The species occurs in traverses IV-VIII to a depth of 100 m. except in VIII where it goes to 145 m. Most frequencies are less than 1 per cent; a few shoaler than 50 m. reach a maximum of 3 per cent.

Quinqueloculina compta Cushman

(Plate 3, figures 20, 21)

Quinqueloculina compta Cushman, 1947, Contr. Cushman Lab. Foram. Res., vol. 23, pt. 4, p. 87, pl. 19, fig. 2.

The distribution is in traverses IV-VIII, XI (once), to a depth of 155 m. Frequencies up to 3 per cent occur shoaler than 50 m.; deeper, they are less than 1 per cent.

Quinqueloculina horrida Cushman
(Plate 4, figures 3, 4)

Quinqueloculina horrida Cushman, 1947, Contr. Cushman Lab. Foram. Res., vol. 23, pt. 4, p. 88, pl. 19, fig. 1.

The species occurs in traverses IV-IX to a depth of 370 m. With a few exceptions all frequencies are less than 1 per cent, never greater than 3 per cent.

Quinqueloculina lamarckiana d'Orbigny
(Plate 4, figures 5, 6)

Quinqueloculina lamarckiana d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminifères," p. 189, pl. 11, figs. 14, 15.

This species, as I have defined it in this area, may represent a "species group" rather than a discrete species. There is great variation in the acuteness of the chamber angles and the extent to which they project. There is also variation in the length of the apertural neck.

The distribution is in traverses IV-XI to a depth of 275 m.; scattered deeper than 180 m. Frequencies are 1-5 per cent at the shoaler ends of the traverses extending to various depths but never deeper than 150 m. There are a few specimens, probably displaced, found deeper than 1500 m. in traverses II and X.

Quinqueloculina cf. polygona d'Orbigny
(Plate 4, figures 7, 8)

Quinqueloculina polygona d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminifères," p. 198, pl. 12, figs. 21-23.

This species is very similar to d'Orbigny's figured specimen but is relatively broader, has a more elongate aperture and a shorter neck.

Specimens occur in traverses IV-IX, XI, consistently to a depth of 100 m.; scattered to 185 m. All frequencies are less than 1 per cent.

Quinqueloculina sabulosa Cushman
(Plate 4, figures 9, 10)

Quinqueloculina sabulosa Cushman, 1947, Contr. Cushman Lab. Foram. Res., vol. 23, pt. 4, p. 87, pl. 18, fig. 22.

This species occurs in traverses IV-VIII to a depth of 100 m. All frequencies are less than 1 per cent.

Quinqueloculina venusta Karrer
(Plate 4, figures 13, 14)

Quinqueloculina venusta Karrer, 1868, Sitz. K. Akad. Wiss. Wien, vol. 58, Abt. 1, p. 147, pl. 2, fig. 6.

This species occurs in traverse VI (once), VIII (once), IX-XI, deeper than 1700 m. Frequencies are less than 1 per cent except for one occurrence of 2 per cent at 3164 m. in VIII.

Quinqueloculina sp.
(Plate 4, figures 11, 12)

This species is similar to the form referred by Phleger *et al* (1953, p. 28) to *Q.* cf. *weaveri* Rau, except that it has a small, simple tooth. The species is not sufficiently common to describe adequately. The maximum length is 0.6 mm.

It occurs in traverses II, III, V-XI, but chiefly in VI-XI deeper than 915 m., except in VII where it occurs deeper than 585 m. Frequencies are less than 1 per cent except occasionally in IX-XI where the maximum is 3 per cent.

Spiroloculina cf. grata Terquem
(Plate 4, figure 15)

Spiroloculinā grata Terquem, 1878, Mém. Soc. Géol. France, ser. 3, vol. 1, p. 55, pl. 5 (10), figs. 14, 15.

This species is referred by Phleger and Parker (1951, p. 8) to *S. antillarum* d'Orbigny. I sent specimens to Miss Ruth Todd for study and she agrees that they closely resemble *S. grata.* The test of *S. antillarum* has a polished surface, *S. grata* a dull, slightly roughened one.

S. cf. *grata* occurs in traverses IV-VIII to a depth of 145 m. except in VIII where it extends to 585 m. Frequencies are mostly less than 1 per cent; 1 per cent occasionally.

Spiroloculina soldanii Fornasini
(Plate 4, figure 16)

Frumentaria sextae speciei Soldani, 1780, Saggio Orittografico, p. 111, pl. 9, figs. 52t, T, V.

Spiroloculina soldanii Fornasini, 1886, Boll. Soc. Geol. Ital., vol. 5, p. 25.

There is some question whether or not this may be a gradational form of *S. depressa* d'Orbigny. Miss Ruth Todd reports (personal communication) that the two species grade into one another. A careful study of type and topotype material should

be made to determine this. I am referring the Gulf of Mexico species to *S. soldanii* since it resembles this form more closely.

It occurs in traverses IV-IX, XI to a depth of 320 m. Most frequencies are less than 1 per cent.

Sigmoilina distorta Phleger and Parker
(Plate 4, figures 17, 21)

Sigmoilina distorta Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 8, pl. 4, figs. 3-5.

This species occurs chiefly in traverses IV-VIII, with rare occurrences in IX-XI. Most occurrences are shoaler than 500 m. but there are a few deeper ones, possibly displaced, in X and XI. Frequencies are variable with a maximum of 3 per cent.

Sigmoilina schlumbergeri A. Silvestri
(Plate 4, figure 18)

Sigmoilina schlumbergeri A. Silvestri, 1904, Mem. Pont. Accad. Nuovi Lincei, vol. 22, p. 267.

This species is widely distributed in all traverses but I and IV, deeper than 175 m. The most consistent occurrence is deeper than 585 m. All occurrences shoaler than 915 m. have a frequency of less than 1 per cent; slightly higher ones occur occasionally in deeper water.

Sigmoilina tenuis (Czjzek)
(Plate 4, figure 19)

Quinqueloculina tenuis Czjzek, 1848, Haidinger's Nat. Abhandl. vol. 2, p. 149, pl. 13, figs. 31-34.

This species occurs in traverses III (once), V (twice), VI-XI, deeper than 140 m. All frequencies are less than 1 per cent except at the inner ends of IX and XI where frequencies of 1 per cent occur.

Sigmoilina sp.
(Plate 5, figure 1, Text figure 2)

This species may be referable to "*Spiroloculina arenaria*" H. B. Brady. Sectioning shows that the Gulf of Mexico form is a *Sigmoilina* and since it would be preferable to section Brady's specimens before transferring his species to *Sigmoilina* I have not given the Gulf of Mexico species a name at this time.

The species occurs in traverses V (once), VI-IX, XI to a depth of 255 m. Frequencies are less than 1 per cent except in VII where they are 1 and 3 per cent at 86 m. and 146 m. respectively.

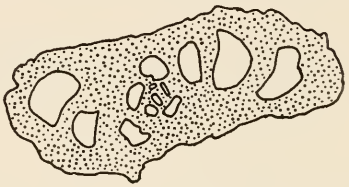

Fig. 2. *Sigmoilina* sp. Transverse section. X 55. Sta. 59.

Nummoloculina irregularis (d'Orbigny)
(Plate 4, figure 20)

Biloculina irregularis d'Orbigny, 1839, Voy. Amer. Mérid., vol. 5, pt. 5, "Foraminifères," p. 67, pl. 8, figs. 20, 21.

The distribution of this species is very scattered. It occurs in traverse IX from 320 m. to 425 m., in traverses II (once), III (once), X, XI deeper than 914 m. Frequencies are less than 1 per cent except in X (once) and XI where they reach a maximum of 5 per cent.

Triloculina cf. brevidentata Cushman
(Plate 5, figures 2, 3)

Triloculina brevidentata Cushman, 1944, Spec. Publ. 12, Cushman Lab. Foram. Res., p. 16, pl. 2, figs. 25a, b.

Gulf of Mexico specimens are relatively broader than those of Cushman's species and the chambers are slightly more inflated.

This species occurs in traverses IV-IX, XI to a depth of 255 m. Frequencies are less than 1 per cent except in V where there is a maximum of 2 per cent at the inner end and VII with a maximum of 1 per cent at the inner end.

Triloculina tricarinata d'Orbigny
(Plate 4, figure 22)

Triloculina tricarinata d'Orbigny, 1826, Ann. Sci. Nat., vol. 7, p. 299, no. 7; Modèles, no. 94.

The distribution is scattered in all traverses but I and IV. The most consistent occurrence is deeper than 1000 m. but the species is found deeper than 55 m. Frequencies are usually less than 1 per cent, never more than 1 per cent.

Pyrgo murrhina (Schwager)
(Plate 5, figure 7)

Biloculina murrhina Schwager, 1866, Novara Exped., Geol. Theil., vol. 2, p. 203, pl. 4, figs. 15 a-c.

There is a good deal of variation in the sinus at the base of the test. It is sometimes curved with two sharp points at either end and may be straight with no projecting points.

This species is widely distributed in all traverses except I and IV but most occurrences are in VI-XI. It is found at all depths but is more abundant deeper than 900 m. where frequencies as high as 4 per cent occur in IX-XI. Elsewhere frequencies are less than 1 per cent.

Pyrgo cf. nasutus Cushman
(Plate 5, figure 4)

Pyrgo nasutus Cushman, 1935, Smithsonian Misc. Coll., vol. 91, no. 21, p. 7, pl. 3, figs. 1-4.

Gulf of Mexico specimens have a less serrate periphery than the form described by Cushman.

The species occurs in traverses III-IX, XI to a depth of 530 m. Frequencies are usually less than 1 per cent; occasionally slightly higher.

Family OPHTHALMIDIIDAE

Nodobacculariella cassis (d'Orbigny)
(Plate 5, figure 8)

Vertebralina cassis d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminifères," p. 51, pl. 7, figs. 14, 15.

N. atlantica Cushman and Hanzawa may be included in the population counts under this species. The specimens are often much worn and specific identification difficult.

N. cassis occurs in traverses IV-VIII, IX (once), XI. Most occurrences are shoaler than 150 m., a few extending to 240 m. At less than 100 m. frequencies up to 5 per cent occur, with one occurrence in VIII of 11 per cent. Deeper than 100 m. frequencies are less than 1 per cent.

Wiesnerella auriculata (Egger)
(Plate 5, figure 13)

Planispirina auriculata Egger, 1893, Abhandl. k. bay. Akad. Wiss. München, vol. 18, pt. 2, p. 245, pl. 3, figs. 13-15.

This species occurs chiefly in traverses V-VIII, with single occurrences in I and III, and two in IV. All but two occurrences are shoaler than 185 m. Frequencies are less than 1 per cent.

Family TROCHAMMINIDAE

Trochammina advena Cushman
(Plate 5, figures 5, 6)

Trochammina advena Cushman, 1922, Publ. 311, Carnegie Instit. Washington, p. 20, pl. 1, figs. 2-4.

This species occurs at frequencies of 1-5 per cent in traverse I from 128 m. to 430 m. Other occurrences are scattered in traverses II, III, V, VI at various depths to 1100 m., at frequencies of less than 1 per cent (except for one occurrence of 4 per cent in II at 314 m.).

Trochammina globulosa Cushman
(Plate 5, figures 11, 12)

Trochammina globulosa Cushman, 1920, Bull. U. S. Nat. Mus., vol. 104, pt. 2, p. 77, pl. 16, figs. 3, 4.

There is some variation in the texture of the test walls, some being smoother and more fine grained than others. The specimens were not as big as Cushman's, having a maximum diameter of 0.62 mm.

The species occurs in all traverses but I and IV deeper than 1000 m., except in II where it occurs deeper than 915 m., with frequencies up to 6 per cent.

Trochammina cf. japonica Ishiwada
(Plate 5, figures 9, 10)

Trochammina japonica Ishiwada, 1950, Japan Geol. Surv. Bull., Kawasaki, Japan, vol. 1, no. 4, p. 190, pl., figs. 2a-c.

Northeastern Gulf of Mexico specimens are the same as *Trochammina* sp. Phleger and Parker (1951, p. 9).

The occurrence is most consistent in traverses I-III from 200 m. to 1750 m. at frequencies from 1 to 13 per cent. In traverses V-VII, X, XI the species has a scattered distribution at all depths deeper than 130 m. with frequencies less than 1 per cent.

Trochammina quadriloba Höglund
(Plate 5, figures 14, 15)

Trochammina pusilla Höglund, 1947, (not *Serpula pusilla* Geinitz, 1848), Zool. Bidrag Uppsala, vol. 26, p. 201, pl. 17, figs. 4a-c, text figs. 183, 184.

Trochammina quadriloba Höglund, 1948, Contr. Cushman Lab. Foram. Res., vol. 24, pt. 2, p. 46.

This species has a very scattered distribution at various depths except in traverses I-III where it occurs between 70 m. and 430 m. Frequencies are as high as 22 per cent in I and 17 per cent, shoaler than 210 m., in II. Elsewhere frequencies are less than 1 per cent except for one occurrence of 6 per cent in II at 914 m.

Trochammina squamata Jones and Parker and related spp.

Trochammina squamata Jones and Parker, 1860, Quart. Journ. Geol. Soc. London, vol. 16, p. 304; Parker and Jones, 1865, Philos. Trans. Roy. Soc. London, vol. 155, p. 407, pl. 15, figs. 30, 30a-c.

Representatives of this group occur in all traverses but II and IX usually shallower than 100 m. Frequencies are mostly less than 1 per cent although they are occasionally as high as 5 per cent.

Trochammina cf. tasmanica Parr
(Plate 5, figures 16, 17)

Trochammina tasmanica Parr. 1950, B. A. N. Z. Antarctic Res. Exped. 1929-31, ser. B, vol. 5, pt. 6, p. 279, pl. 5, fig. 18.

Gulf of Mexico forms are similar to Parr's but are smaller, with a maximum diameter of 0.26 mm., and appear to have a slightly higher spire.

This species has a very scattered occurrence throughout the area with frequencies in traverses I-III, where it occurs most consistently, up to 5 per cent (once 18 per cent). Other frequencies are less than 1 per cent.

Nouria polymorphinoides Heron-Allen and Earland
(Plate 5, figure 19)

Nouria polymorphinoides Heron-Allen and Earland, 1914, Trans. Zool. Soc. London, vol. 20, pt. 12, p. 376, pl. 37, figs. 1-15.

Proteonina comprima Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 2, pl. 1, figs. 1-3.

The distribution is in traverses IV, V, VII, VIII to a depth of 75 m. Frequencies are less than 1 per cent except for one occurrence of 9 per cent in IV at 40 m.

Nouria sp.

(Plate 5, figure 20)

This species is smaller than *N. polymorphinoides* with a more regular oval shape and more finely arenaceous wall. The wall is constructed of sand grains of irregular size, some being much larger than others, and is very thin and fragile. It may be new.

It occurs in traverses I-IV to a depth of 130 m. Frequencies are high with maxima of 59 per cent in I, 81 per cent in II, 11 per cent in III and 22 per cent in IV.

Family LAGENIDAE

Robulus spp.

All species of this genus are combined in the population counts. They occur in all traverses, except I, at all depths. Occurrences are scattered in traverses II-IV. Frequencies of 1-5 per cent occur to a depth of 450 m. in VI-IX, XI; elsewhere they are less than 1 per cent.

Lenticulina peregrina (Schwager)

(Plate 5, figure 18)

Cristellaria peregrina Schwager, 1866, Novara Exped., Geol. Theil., vol. 2, p. 245, pl. 7, fig. 89.

This species has a wide distribution in all traverses except I and IV. Most occurrences are deeper than 145 m. Frequencies are less than 1 per cent.

Marginulina marginulinoides (Goës)

(Plate 5, figure 21)

Cristellaria aculeata var. *marginulinoides* Goës, 1896, Bull. Mus. Comp. Zool., vol. 29, p. 56, pl. 5, figs. 15, 16.

No keeled specimens are found but in other respects this form closely resembles Goës' species. Other species of *Marginulina* are found in the area but occur only rarely, being confined to a depth of less than 500 m.

The distribution is scattered with single occurrences in traverses II, V, VIII and more consistent occurrences in VI and VII. The depth range is 50 m. to 450 m. All frequencies are less than 1 per cent.

Dentalina spp., nodosaria spp.

These genera have a scattered distribution at all depths, usually deeper than 100 m. Frequencies are low.

Nodosaria hispida d'Orbigny
(Plate 6, figure 1)

Nodosaria hispida d'Orbigny, 1846, Foram. Foss. bass. tert. Vienne, p. 35, pl. 1, figs. 24, 25.

Specimens which may be referred to var. *sublineata* H. B. Brady are included here though most of them are hirsute in character.

Single occurrences are found in traverses V, IX, XI; more consistent ones in VI-VIII. They occur deeper than 145 m. and, with one exception, no deeper than 715 m. Frequencies are less than 1 per cent.

Pseudoglandulina comatula (Cushman)
(Plate 5, figure 22)

Nodosaria comatula Cushman, 1923, Bull. U. S. Nat. Mus., vol. 104, pt. 4, p. 83, pl. 14, fig. 5.

There is a scattered distribution in traverses VI-XI, mostly between 135 and 255 m. Frequencies are less than 1 per cent.

Lagena spp. and related forms

The species included in this group usually have a scattered or rare occurrence but the group taken as a whole is an important part of the fauna, occurring in all traverses but I at all depths. Frequenices are usually less than 1 per cent to a depth of 140 m., 1-5 per cent elsewhere except in traverses II (once), X, and XI where they may be as high as 10 per cent.

Family POLYMORPHINIDAE

Guttulina australis (d'Orbigny)
(Plate 6, figure 2)

Globulina australis d'Orbigny, 1839, Voy. Amer. Mérid., vol. 5, pt. 5, "Foraminifères," p. 60, pl. 1, figs. 1-4.

This species occurs in traverses IV-VIII to a depth of 85 m. Frequencies are usually less than 1 per cent but reach a maximum of 2 per cent at the inner end of IV.

Globulina caribaea d'Orbigny
(Plate 5, figure 23)

Globulina caribaea d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminifères," p. 135, pl. 2, figs. 7, 8.

Occurrences are in traverses IV-VIII to a depth of 58 m. Frequencies are less than 1 per cent.

Family NONIONIDAE

Nonion formosum (Seguenza)
(Plate 6, figure 3)

Nonionina formosa Seguenza, 1880, Atti R. Accad. Lincei, ser. 3, vol. 6, p. 63, pl. 7, figs. 6, 6a.

Nonion barleeanum (Williamson) var. *inflatum* van Voorthuysen, 1950 (not *Nonionina inflata* Alth, 1850), Meded. Geol. Sticht., n. s., no. 4, p. 41, text fig. 7, pl. 3, figs. 6a, b.

Anomalinoides barleeanum (Williamson) var. *zaandamae* (van Voorthuysen) van Voorthuysen, 1952, Journ. Pal., vol. 26, no. 4, p. 681.

Comparison with specimens sent by van Voorthuysen and of these with topotype material of *N. formosum* at the U. S. National Museum by A. R. Loeblich appears to confirm this identification. Similar specimens were so referred by Phleger *et al* (1953, p. 30).

This species occurs in traverses V-IX, XI from 60 m. to 1750 m. Most frequencies are less than 1 per cent.

Nonion pompilioides (Fichtel and Moll)
(Plate 6, figure 4)

Nautilus pompilioides Fichtel and Moll, 1798, Test. Micr., p. 31, pl. 2, figs. a-c.

There are single occurrences in traverses III, VI, VIII and X

and there is a more consistent distribution in traverses II, VII, IX, XI. All occurrences are deeper than 2200 m. Frequencies are usually 1-4 per cent except at the outer end of XI where they are as high as 8 per cent.

Astrononion tumidum Cushman and Edwards
(Plate 6, figure 5)

Nonionina stelligera H. B. Brady (pt.), 1884 (not d'Orbigny 1839), Rept. Voy. CHALLENGER, Zool., vol. 9, p. 728, pl. 109, fig. 5 (not figs. 3, 4).

Astrononion tumidum Cushman and Edwards, 1937, Contr. Cushman Lab. Foram. Res., vol. 13, pt. 1, p. 33, pl. 3, fig. 17.

The only reported occurrence of this species is that of Brady's figured specimen from CHALLENGER station 344, in 240 fms. off Ascension Island, south Atlantic.

There are single occurrences in traverses V, VI, IX, and XI, consistent ones in VII, VIII, X. The depth range is 320 m. to 1400 m., with one occurrence at 2550 m. All frequencies are less than 1 per cent.

Nonionella atlantica Cushman
(Plate 6, figures 6, 7)

Nonionella atlantica Cushman, 1947, Contr. Cushman Lab. Foram. Res., vol. 23, pt. 4, p. 90, pl. 20, figs. 4, 5.

Combined in the population counts with this species are specimens of a more compressed form (Pl. 6, figs. 8, 9) and a small form which resembles *N. sloanii* (d'Orbigny).

N. atlantica occurs in traverses II-VIII, XI (once). The most consistent occurrence is shoaler than 500 m. with frequencies up to 10 per cent shoaler than 140 m., less than 1 per cent deeper than 140 m. A few single occurrences are at great depths and probably represent displaced specimens.

Nonionella opima Cushman
(Plate 6, figures 10, 11, 12)

Nonionella opima Cushman, 1947, Contr. Cushman Lab. Foram. Res., vol. 23, pt. 4, p. 90, pl. 20, figs. 1-3.

This species occurs in traverses I-VII, XI. Consistent occurrences are found shoaler than 400 m. and scattered ones deeper. Frequencies up to 20 per cent may occur shoaler than 100 m., up to 5 per cent deeper. There is one occurrence of 31 per cent in III at 53 m.

Elphidium advenum (Cushman)
(Plate 6, figure 14)

Polystomella advena Cushman, 1922, Publ. 311, Carnegie Instit. Washington, p. 56, pl. 9, figs. 11, 12.

The specimens in this area have a larger umbo than those described by Cushman. In other respects they appear similar.

All occurrences are shoaler than 115 m. in traverses IV-VIII. Frequencies are in most cases less than 1 per cent.

Elphidium discoidale (d'Orbigny)
(Plate 6, figure 15)

Polystomella discoidalis d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminifères," p. 56, pl. 6, figs. 23, 24.

This species occurs in traverses IV-VIII shoaler than 185 m. Frequencies are up to 5 per cent to a depth of 100 m., less than 1 per cent deeper.

Elphidium gunteri Cole
(Plate 6, figure 16)

Elphidium gunteri Cole, 1931, Florida State Geol. Surv. Bull. 6, p. 34, pl. 4, figs. 9, 10.

Elphidium gunteri Cole var. *galvestonensis* Kornfeld, 1951, (part), Contr. Dept. Geol. Stanford Univ., vol. 1, no. 3, p. 87, pl. 15, figs. 2a, b, 3a, b (not figs. 1a, b).

?*Elphidium littorale* Le Calvez and Le Calvez, 1951, Vie et Milieu, vol. 2, no. 2, p. 251, text figs. 5a, b.

E. littorale is placed in the synonymy questionably because the types have not been seen. It appears from the description and figures, however, to be synonymous. The only apparent difference is that it is described as having 10-12 chambers in the last-formed whorl whereas Cole's species may have as many as 14. As stated by Parker *et al* (1953, p. 8) part of Kornfeld's form *E. gunteri* var. *galvestonensis* is referable to *E. gunteri* as shown by a study of his types.

E. gunteri occurs in traverses III (once), IV-VIII to a depth of 80 m. except in VIII where it occurs to a depth of 185 m. Frequencies up to 5 per cent occur shoaler than 55 m., less than 1 per cent deeper. There are two occurrences of 9 per cent at the inner ends of IV and V.

Elphidium poeyanum (d'Orbigny)
(Plate 6, figure 17)

Polystomella poeyana d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminifères," p. 55, pl. 6, figs. 25, 26.

The species occurs in traverses IV-VIII shoaler than 145 m. Frequencies up to 2 per cent occur at the inner end of various traverses; elsewhere they are less than 1 per cent.

Elphidium spp.

This group includes various species which have very low frequency distributions when considered separately. It occurs mostly in traverses III-VIII with some occurrences in I, II, IX, XI. Frequencies up to 5 per cent occur to a depth of 150 m., less than 1 per cent deeper. Occurrences are consistent to 185 m. and extend deeper in V and XI.

Family PENEROPLIDAE

This family has been considered as a group owing to the impossibility of identifying a relatively high proportion of the specimens. Many are badly weathered and there is usually a profusion of juvenile forms present.

The distribution is shoaler than 145 m. in traverses IV-VIII, with a single occurrence in XI. There is one occurrence in II at 375 m. Frequencies up to 16 per cent shoaler than 60 m., up to 5 per cent shoaler than 90 m. and less than 1 per cent elsewhere.

Family BULIMINIDAE

Buliminella cf. bassendorfensis Cushman and Parker
(Plate 6, figure 13)

Buliminella bassendorfensis Cushman and Parker, 1937, Contr. Cushman Lab. Foram. Res., vol. 13, pt. 1, p. 40, pl. 4, figs. 13a, b.

This species occurs in traverses I-VI to a depth of 80 m. except in III where it extends to 370 m. at a frequency of less than 1 per cent. There are two occurrences deeper than 1700 m. Frequencies are variable but reach a maximum of 35 per cent at 77 m. in III.

Robertina bradyi Cushman and Parker
(Plate 6, figure 18)

Robertina bradyi Cushman and Parker, 1936, Contr. Cushman Lab. Foram. Res., vol. 12, p. 99, pl. 16, figs. 9a, b.

This species has a scattered occurrence in traverses VI-VIII and a more consistent one in IX-XI. The depth range is 105 m. to 2600 m. Frequencies are less than 1 per cent except in X and XI where they reach a maximum of 2 per cent deeper than 1300 m.

Bulimina aculeata d'Orbigny
(Plate 6, figure 19)

Bulimina aculeata d'Orbigny, 1826, Ann. Sci. Nat., vol. 7, p. 269, no. 7.

This species is widely distributed in all traverses except I and IV deeper than 220 m., except for a shallow occurrence in III. Between 370 m. and 1850 m. frequencies up to 16 per cent occur; elsewhere they are usually less than 1 per cent.

Bulimina alazanensis Cushman
(Plate 6, figure 21)

Bulimina alazanensis Cushman, 1927, Journ. Pal., vol. 1, p. 161, pl. 25, fig. 4.

This is a widely distributed species in all traverses but I and IV, deeper than 220 m. Frequencies are usually 1-5 per cent but may be as high as 15 per cent.

Bulimina marginata d'Orbigny
(Plate 6, figure 20)

Bulimina marginata d'Orbigny, 1826, Ann. Sci. Nat., vol. 7, p. 269, no. 4, pl. 12, figs. 10-12.

As in the northwestern Gulf of Mexico, specimens are smaller than typical, more spinose, and have more undercut chambers.

This species occurs in traverses II-VII to a depth of 530 m. It does not occur shoaler than 75 m. except in IV. Frequencies are very variable, reaching a maximum of 33 per cent in II at 168 m. Deeper than 320 m. frequencies are less than 1 per cent.

Bulimina spicata Phleger and Parker
(Plate 6, figures 22, 23)

Bulimina spicata Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 16, pl. 7, figs. 25a-c, 30, 31.

This is a widely distributed species in all but traverses I and IV deeper than 70 m. Frequencies vary up to a maximum of 5 per cent.

Bulimina striata mexicana Cushman
(Plate 6, figure 24)

Bulimina striata d'Orbigny var. *mexicana* Cushman, 1922, Bull. U. S. Nat. Mus., vol. 104, pt. 3, p. 95, pl. 21, fig. 2.

This species occurs in all traverses but I and IV deeper than 170 m. Frequencies seldom exceed 5 per cent.

Globobulimina affinis (d'Orbigny) and variant
(Plate 6, figure 25; Plate 7, figures 1, 2)

Bulimina affinis d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminifères," p. 105, pl. 2, figs. 25, 26.

Occurring with, or independently of, the typical form are specimens which are relatively much more narrow. These forms appear to have a somewhat deeper range, although there are exceptions. It is often difficult to separate the two forms, and for this reason they have been combined in the population counts.

The distribution is rather scattered in all traverses except I and IV, deeper than 165 m. Frequencies up to 5 per cent occur.

Globobulimina mississippiensis n. sp.
(Plate 7, figures 3, 4, 10)

Test of medium size, ovate, with the greatest width usually below or near the middle, sometimes almost as long as broad; initial end rounded in the megalospheric form, slightly pointed in microspheric; chambers slightly inflated, the last-formed whorl making up 1/8 to 1/7th of the test; sutures very slightly depressed; wall thin, translucent, finely perforate; aperture with a thickened border, the tongue extending from the test, curved, with a regular, non-toothed border. Maximum length 0.51 mm.; width 0.36 mm.

Holotype from station 29, Lat. 29°04.5′ N; Long. 88°52′ W at 155 m.

This species differs from *G. ovula* (d'Orbigny) in the non-depressed suture and non-inflated area of the last-formed chamber leading down from the aperture; the remaining chambers also are less inflated so that the outline of *G. mississippiensis* is much more regular. The species from the Caribbean discussed by Höglund (1947, p. 244) as *G.* sp. A is much larger, has fewer chambers, a deeply depressed portion of the suture near the aperture, and the last-formed whorl makes up a greater portion of the test.

There are single occurrences in traverses I and II and consistent ones in III from 105-205 m. Frequencies in III are 2-3 per cent.

Virgulina advena Cushman

(Plate 7, figure 5)

Virgulina (?) advena Cushman, 1922, Bull. U. S. Nat. Mus., vol. 104, pt. 3, p. 120, pl. 25, figs. 1-3.

As pointed out by Phleger *et al* (1953, p. 34) this appears to be a true *Virgulina.*

It has a scattered occurrence in all traverses but I and IV, deeper than 1250 m. Most frequencies are less than 1 per cent but they reach a maximum of 2 per cent at 2697m. in VI.

Virgulina complanata Egger

(Plate 7, figure 6)

Virgulina schreibersiana Czjzek var. *complanata* Egger, 1893, Abhandl. k. bay. Akad. Wiss. München, vol. 18, pt. 2, p. 292, pl. 8, figs. 91, 92.

This is a widely distributed species in all traverses but I and at all depths. Frequencies are less than 1 per cent.

Virgulina mexicana Cushman

(Plate 7, figures 7, 8)

Virgulina mexicana Cushman, 1922, Bull. U. S. Nat. Mus., vol. 104, pt. 3, p. 120, pl. 23, fig. 8.

This species is widely distributed but does not occur consistently. It occurs in all traverses but I and IV deeper than 110 m. Frequencies are less than 1 per cent.

Virgulina pontoni Cushman
(Plate 7, figure 9)

Virgulina pontoni Cushman, 1932, Contr. Cushman Lab. Foram. Res., vol. 8, pt. 1, p. 17, pl. 3, fig. 7.

This species has a scattered occurrence in all traverses but IX-X. Most occurrences are shoaler than 205 m. but some go to 530 m., with two deep occurrences in XI. Frequencies may be as high as 4 per cent, shoaler than 105 m.; deeper they are less than 1 per cent in most cases.

Virgulina punctata d'Orbigny
(Plate 7, figure 11)

Virgulina punctata d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminifères," p. 139, pl. 1, figs. 35, 36.

This species occurs in traverses III-VIII, X, XI. The most concentrated occurrence is shoaler than 150 m. but in V, X, XI specimens occur to a depth of 2550 m. Shoaler than 130 m. frequencies may be as high as 5 per cent; deeper they are less than 1 per cent.

Virgulina tessellata Phleger and Parker
(Plate 7, figure 12)

Virgulina tessellata Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 19, pl. 9, figs. 15a, b, 16a, b.

This species occurs in traverses II, III, V-VIII, XI (once) from 375-2200 m. Shoaler than 1000 m. frequencies are usually less than 1 per cent but may be as high as 2 per cent; deeper than 1000 m. they reach a maximum of 15 per cent at 1262 m. in III.

Bolivina albatrossi Cushman
(Plate 7, figure 13)

Bolivina albatrossi Cushman, 1922, Bull. U. S. Nat. Mus., vol. 104, pt. 3, p. 31, pl. 6, fig. 4.

This species has a wide distribution, most commonly from 145 m. to 1900 m. but with scattered occurrences elsewhere. Frequencies may be as high as 10 per cent between 180 m. and 1300 m.

Bolivina barbata Phleger and Parker
(Plate 7, figure 14)

Bolivina barbata Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 13, pl. 6, figs. 12a, b, 13.

This species has a scattered occurrence in traverses I-III, V-VII. Most occurrences are shoaler than 205 m. but extend, mostly in V, to 530 m. Frequencies are variable reaching a maximum of 26 per cent in III at 155 m. In most cases deeper than 205 m. they are less than 1 per cent.

Bolivina fragilis Phleger and Parker
(Plate 7, figure 15)

Bolivina fragilis Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 13, pl. 6, figs. 14, 23, 24a, b.

This species occurs in traverses V-IX, XI shoaler than 255 m. (3 exceptions). Frequencies from 1-5 per cent occur from 100-255 m. with one occurrence of 7 per cent in V at 146 m.

Bolivina goësii Cushman
(Plate 7, figure 16)

Bolivina goësii Cushman, 1922, Bull. U. S. Nat. Mus., vol. 104, pt. 3, p. 34, pl. 6, fig. 5.

This species occurs in traverses VI-XI from 135 m. to 320 m. with a few scattered low-frequency occurrences deeper. Frequencies vary up to a maximum of 7 per cent in IX at 256 m.

Bolivina lanceolata n. sp.
(Plate 7, figures 17, 18, 19, 20)

Test regularly tapered, initial end sometimes with a very short spine, compressed, periphery acute, sometimes with a very narrow keel, especially on the last-formed chambers; chambers uninflated, narrow, increasing gradually in height as added; sutures very slightly limbate, straight, at an angle of forty-five degrees with the horizontal; wall with medium-sized perforations except on clear areas on the inner and upper portion of the earlier chambers, sometimes with a few fine costae extending two-thirds of the way up the test; aperture narrow, keeled. Maximum length 0.6 mm.; width 0.14 mm.

Holotype from station 180, Lat. 29°04′ N, Long. 85°49′ W, at a depth of 183 m.

This species differs from *B. acerosa* Cushman in having a larger test, a higher ratio of breadth to length, and in having clear areas on the inner portions of the chambers. The initial portion of the test is less closely costate, but the costae when present extend farther up the test. It differs from *B. punctata* d'Orbigny in having costae, in being keeled on the later portion of the test rather than the earlier portion, and in the less curved sutures.

This species is widely distributed in traverses V-XI, deeper than 45 m. Frequencies are usually low but may be as high as 4 per cent.

Bolivina lowmani Phleger and Parker
(Plate 7, figure 21)

Bolivina lowmani Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 13, pl. 6, figs. 20a, b, 21.

This is a very common, widely distributed species in all traverses but I, at all depths. Frequencies are usually 1-5 per cent but reach a maximum of 8 per cent in VIII at 1730 m.

Bolivina minima Phleger and Parker
(Plate 7, figures 22, 23)

Bolivina minima Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 14, pl. 6, figs. 22a, b, 25; pl. 7, figs. 1, 2.

This species is a very common one in traverses V-XI deeper than 110 m. with a single occurrence in IV at 55 m. Frequencies to a depth of 530 m. vary from 1-14 per cent; they do not exceed 5 per cent between 530 m. and 915 m. Deeper than this they are less than 1 per cent.

Bolivina ordinaria Phleger and Parker
(Plate 7, figure 24)

Bolivina simplex Phleger and Parker, 1951 (not *B. interjuncta* Cushman var. *simplex* Cushman and Renz, 1941), Mem. Geol. Soc. America, vol. 46, pt. 2, p. 14, pl. 7, figs. 4-6.

Bolivina ordinaria Phleger and Parker, 1952, Contr. Cushman Found. Foram. Res., vol. 3, pt. 1, p. 14.

This species is widely distributed in all traverses but I and IV deeper than 115 m. (one exception). The most consistent distribution is not deeper than 1800 m. but there are scattered occurrences deeper. Frequences are variable reaching a maximum of 19 per cent in III at 205 m.

Bolivina paula Cushman and Cahill
(Plate 7, figure 26)

Bolivina paula Cushman and Cahill, 1932, in Cushman and Ponton, Bull. Florida State Geol. Surv. vol. 9, p. 84, pl. 12, figs. 6a, b.

This species is reported from the Recent in the North Atlantic (Phleger, *et al*, 1953, p. 35) in displaced faunas from shallower water. Other reports are from the Miocene of the eastern United States.

It has a scattered occurrence at all depths in traverses II, V-XI. Frequencies are less than 1 per cent.

Bolivina pulchella primitiva Cushman
(Plate 7, figure 36)

Bolivina pulchella (d'Orbigny) var. *primitiva* Cushman, 1930, Bull. Florida State Geol. Surv., vol. 4, p. 47, pl. 8, figs. 12a, b.

No specimens of typical *B. pulchella* occur in this area.

Occurrences are in traverses II, IV-XI at all depths. Frequencies are less than 1 per cent in most cases.

Bolivina pusilla Schwager
(Plate 7, figure 31)

Bolivina pusilla Schwager, 1866, Novara-Exped. Geol. Theil., vol. 2, p. 254, pl. 7, fig. 101.

Specimens are the same size as those described by Schwager (0.35 mm. in length) but smaller than those observed in the North Atlantic by Phleger *et al* (1953, p. 36) which have a maximum length of 0.54 mm.

There are three shallow occurrences at less than 250 m. but the species usually occurs deeper than 1300 m. in traverses II, III, V, VI, VII-XI. Frequencies are less than 1 per cent except in V where they reach a maximum of 2 per cent.

Bolivina striatula spinata Cushman
(Plate 7, figure 29)

Bolivina striatula Cushman var. *spinata* Cushman, 1936, Spec. Publ. no. 6, Cushman Lab. Foram. Res., p. 59, pl. 8, figs. 9a, b.

The types of *B. striatula* have not been studied but a comparison with specimens of that species from shallow water of the San Antonio Bay region off Texas show that the spinate form

should perhaps be given specific rank. It is less compressed, more striate and has an initial spine. Included here with typical specimens are some that are narrower and less strongly striated. Typical specimens seem to grade into this variant especially in the region to the east of traverse V.

With two exceptions the distribution is shoaler than 240 m. in traverses I, III-VIII. Frequencies vary up to a maximum of 5 per cent.

Bolivina subaenariensis mexicana Cushman

(Plate 7, figure 33)

Bolivina subaenariensis Cushman var. *mexicana* Cushman, 1922, Bull. U. S. Nat. Mus., vol. 104, pt. 3, p. 47, pl. 8, fig. 1.

The chief distribution is in traverses III, V-IX from 100 m. to 370 m. but there are scattered occurrences to 35 m. shoaler and 3250 m. deeper; traverses II, IV, X, XI have scattered occurrences. The highest frequencies are between 100 m. and 270 m. reaching a maximum of 32 per cent in III at 155 m.

Bolivina subspinescens Cushman

(Plate 7, figures 30, 35)

Bolivina subspinescens Cushman, 1922, Bull. U. S. Nat. Mus., vol. 104, pt. 3, p. 48, pl. 7, fig. 5.

This species varies, as it does in the northwestern Gulf of Mexico, in the number of spines ornamenting the test and in the amount of undercutting of the chambers.

It is widely distributed in all traverses except I at all depths. Frequencies do not exceed 5 per cent.

Bolivina translucens Phleger and Parker

(Plate 7, figure 34)

Bolivina translucens Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 15, pl. 7, figs. 13, 14a, b.

This species occurs in traverses II, III, V-XI deeper than 145 m. The distribution is rather scattered and does not exceed 1 per cent in frequency.

Bolivina sp.

(Plate 7, figure 25)

This species although fairly widely distributed in the area never is very common. It is smaller, with less coarse perforations than *B. seminuda* Cushman, but in other respects is quite similar to that species.

It occurs in traverses VI-XI deeper than 420 m. Frequencies are less than 1 per cent.

Loxostomum abruptum Phleger and Parker

(Plate 7, figure 32)

Loxostomum truncatum Phleger and Parker, 1951 (not Finlay, 1947), Mem. Geol. Soc. America, vol. 46, pt. 2, p. 17, pl. 7, figs. 15-19.

Loxostomum abruptum Phleger and Parker, 1952, Contr. Cushman Found. Foram. Res., vol. 3, pt. 1, p. 14.

The resemblance of this species to *Bolivina minuta* Natland has been pointed out by Phleger *et al* (1953, p. 35). A study of additional specimens from the California coast shows that Natland's species is more regular with less highly raised sutures. The thicker, more twisted specimens mentioned by Phleger and Parker (1951) do not appear in the California material. The specimens from the Atlantic deep-sea cores are of this type.

The species occurs in all traverses but I and IV but most consistently in VI-XI. Most occurrences are deeper than 445 m. though there are scattered occurrences deeper than 100 m. Deeper than 580 m. frequencies may reach a maximum of 3 per cent; shoaler they are less than 1 per cent.

Rectobolivina advena (Cushman)

(Plate 7, figure 27)

Siphogenerina advena Cushman, 1922, Carnegie Instit. Washington, Publ. 311, p. 35, pl. 5, fig. 2.

In referring this and the following species to the genus *Rectobolivina,* rather than to *Siphogenerina* as has been done by many authors, I am following the analyses of the two genera given by Hofker (1951 b, pp. 116, 232). The differences in internal structure seem to be borne out by differences in the external characters of the tests: *Rectobolivina* being compressed at least in the early portion of the test and usually throughout, *Siphogenerina* being often cylindrical, almost invariably non-

compressed and costate. It seems probable that further analysis of the internal structure and chamber arrangement of the various species assigned to these genera will establish these external characters.

R. advena occurs in traverses IV-VIII, IX (once), XI (once) to a depth of 185 m. There are 3 deeper occurrences. Frequencies are usually less than 1 per cent.

Rectobolivina dimorpha (Parker and Jones)
(Plate 7, figure 37)

Uvigerina (*Sagrina*) *dimorpha* Parker and Jones, 1865, Philos. Trans. Roy. Soc. London, vol. 155, p. 364, pl. 18, fig. 18.

The reasons for referring this species to *Rectobolivina* are given under the previous species.

It occurs in traverses VI-VIII with single occurrences in IX and XI. The depth range is 345 m. to 1400 m. Frequencies are less than 1 per cent.

Reussella atlantica Cushman
(Plate 7, figure 28)

Reussella spinulosa (Reuss) var. *atlantica* Cushman, 1947, Contr. Cushman Lab. Foram. Res., vol. 23, pt. 4, p. 91, pl. 20, figs. 6, 7.

This species occurs in traverses IV-IX, XI to a depth of 235 m. There are two probably displaced occurrences deeper than 900 m. Frequencies reach a maximum of 8 per cent in V at 71 m.

Uvigerina auberiana d'Orbigny
(Plate 7, figure 38; Plate 8, figure 1)

Uvigerina auberiana d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminifères," p. 106, pl. 2, figs. 23, 24.

This and the following species are retained in the genus *Uvigerina*. There is some question in my mind of the necessity or practicality of the genera set up by Hofker (1951b) subdividing this genus. His genus *Alluvigerina* should be placed in the synonymy under *Uvigerina* since the two have the same genotype: *U. pigmea* d'Orbigny. Those interested in the subdivisions into which the Gulf of Mexico forms should be placed according to the Hofker classification will probably find this information in his forthcoming paper on the West Indian fauna.

As pointed out by Phleger *et al* (1953, p. 37), *U. auberiana* shows great variation in size. The species was described as 0.33 mm. in length by d'Orbigny. Gulf of Mexico specimens range from 0.30 mm.-1.0 mm.

This species occurs in traverses II, V-XI deeper than 250 m. Frequencies are usually less than 1 per cent. There is one occurrence of 9 per cent, and several between 1 and 3 per cent in traverses IX-XI.

Uvigerina flintii Cushman
(Plate 8, figure 2)

Uvigerina flintii Cushman, 1923, Bull. U. S. Nat. Mus., vol.104, pt. 4, p. 165, pl. 42, fig. 13.

This species occurs in traverses VI-IX, XI from 85 m. to 420 m. Frequencies are never higher than 5 per cent.

Uvigerina hispido-costata Cushman and Todd
(Plate 8, figure 3)

Uvigerina hispido-costata Cushman and Todd, 1945, Spec. Publ. no. 15, Cushman Lab. Foram. Res., p. 51, pl. 7, figs. 27, 31.

This species occurs in traverses VI-X from 220 m. to 1000 m. Frequencies vary up to 13 per cent.

Uvigerina laevis Goës
(Plate 8, figure 4)

Uvigerina auberiana Goës, 1882 (not d'Orbigny, 1839), Kongl. Svensk. Vet. Akad. Handl., vol. 19, no. 4, p. 60, pl. 4, figs. 71-74.

Uvigerina auberiana d'Orbigny var. *laevis* Goës, 1896, Bull. Mus. Comp. Zool., vol. 29, p. 51.

This species has been raised to specific rank as there seems to be no close relationship to *U. auberiana*. The wall of the test is much less rugose, the chambers less inflated and more elongate in shape, and the whole test relatively more elongate. Gulf of Mexico specimens have a maximum length of 0.6 mm. The maximum length given by Goës is 1.0 mm.

The distribution is in traverses V-XI with a single occurrence in IV. With a single exception occurrences are deeper than 80 m. The highest frequencies are between 160 and 275 m. reaching a maximum of 9 per cent. Shoaler than 90 m. and deeper than 915 m., frequencies are less than 1 per cent.

Uvigerina parvula Cushman
(Plate 8, figure 6)

Uvigerina peregrina Cushman var. *parvula* Cushman, 1923, Bull. U. S. Nat. Mus., vol. 104, pt. 4, p. 168, pl. 42, fig. 11.

It is possible that more than one form has been included here in the population counts. There is considerable variation in the character of the costae which are much more numerous and finer in some specimens than in others. All these forms, however, are distinct from *U. peregrina* which usually is much larger, with higher plate-like costae, frequenly broken up into spines in the upper part of the test.

This species occurs in traverses III-IX, XI to a depth of 445 m. except in V where it extends to a depth of 914 m. Shoaler than 290 m. the frequencies are highest with a maximum of 9 per cent; deeper, they are usually less than 1 per cent.

Uvigerina peregrina Cushman
(Plate 8, figure 5)

Uvigerina peregrina Cushman, 1923, Bull. U. S. Nat. Mus., vol. 104, pt. 4, p. 166, pl. 42, figs. 7-10.

The Gulf of Mexico specimens are identical to topotypes from the northeastern coast of the United States.

This is a widely distributed species in all traverses but I and IV deeper than 200 m. (2 exceptions). Frequencies are relatively high to a depth of 1600 m. reaching a maximum of 25 per cent at 1144 m. in VI, although they are usually less than 20 per cent.

Angulogerina bella Phleger and Parker
(Plate 8, figure 7)

Angulogerina bella Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 12, pl. 6, figs. 7, 8.

This species occurs in traverses III-V, VII, VIII to a depth of 235 m. In X and XI there are 3 occurrences deeper than 940 m. probably representing displaced specimens. Most frequencies are less than 1 per cent.

Angulogerina jamaicensis Cushman and Todd
(Plate 8, figure 8)

Angulogerina jamaicensis Cushman and Todd, 1945, Spec. Publ. no. 15, Cushman Lab. Foram. Res., p. 53, pl. 8, fig. 3.

Specimens were compared with the types by Miss Ruth Todd and found to be identical. The species has not been reported hitherto from Recent sediments.

It occurs in traverses I, IV-IX, XI with the chief occurrence in V-VII. The greatest abundance is shoaler than 150 m. but there are occurrences to a depth of 1750 m. Most frequencies are less than 1 per cent but a maximum of 4 per cent is reached shoaler than 150 m.

Trifarina bradyi Cushman

(Plate 8, figure 9)

Trifarina bradyi Cushman, 1923, Bull. U. S. Nat. Mus., vol. 104, pt. 4, p. 99, pl. 22, figs. 3-9.

This species has a wide distribution in traverses V-XI at all depths. The most consistent occurrence is from 140 to 2150 m. Frequencies are variable reaching a maximum in IX of 8 per cent. Shoaler than 255 m. and deeper than 1900 m. they are always less than 1 per cent.

Family ROTALIIDAE

Spirillina vivipara Ehrenberg

(Plate 8, figures 15, 16)

Spirillina vivipara Ehrenberg, 1843 (1841), Abhandl. k. Akad. Wiss. Berlin, Theil. 1, pp. 323, 422, pl. 3, sec. 7, fig. 41.

This species occurs in traverses VI-VIII, XI to a depth of 285 m. There are three single occurrences, probably of displaced specimens, deeper than 914 m. in III, IX and X. All frequencies are less than 1 per cent.

Conorbina orbicularis (Terquem)

(Plate 8, figures 13, 14)

Rosalina orbicularis Terquem, 1876, Ess. Anim. Plage Dunkerque, pt. 2, p. 75, pl. 9, figs. 4a, b.

This species has a scattered occurrence in traverses VI-VIII, XI to a depth of 160 m., except for one occurrence at 225 m. Frequencies are less than 1 per cent.

"Discorbis" bulbosa n. sp.

(Plate 8, figures 10, 11, 12)

Test small, globose, with a low spire, ventrally concave with an open umbilicus; chambers 8-12, 4 in the last-formed whorl, inflated; sutures curved, depressed; wall thin, often translucent, with coarse perforations; aperture simple, a high arch at the base of the last-formed chamber from the edge of the previous chamber to the periphery. Maximum diameter 0.25 mm.; thickness 0.18 mm.

Holotype from station 220, Lat. 29°49′ N, Long. 88°21′ W, at a depth of 37 m.

This species is referred to *Discorbis* pending further investigation of that genus and related ones. It is apparently not referable to any described genus as presently understood. It differs from *"D." subglobosa* Cushman in having 4 chambers in the last-formed whorl instead of 5, and in the higher spire.

"D." bulbosa occurs in traverses IV-VIII, XI to a depth of 205 m. Shoaler than 100 m. frequencies may be as high as 2 per cent; deeper, they are less than 1 per cent.

Rosalina bertheloti d'Orbigny

(Plate 8, figures 22, 23)

Rosalina bertheloti d'Orbigny, 1839, in Barker-Webb and Berthelot, Hist. Nat. Îles Canaries, vol. 2, pt. 2, "Foraminifères," p. 135, pl. 1, figs. 28-30 (*R. berthelotiana* in expl. of plate).

Hofker (1951a) has made this species the genotype of his genus *Discopulvinulina*. Since he later (Hofker, 1951b) includes in this genus *Rosalina globularis* d'Orbigny, designated as the genotype of *Rosalina* by Galloway and Wissler (1927, p. 62), *Discopulvinulina* becomes a synonym of *Rosalina* d'Orbigny, 1826.[1] *Rosalina* has been made a synonym of the genus *Discorbis* by many authors. As pointed out by Galloway and Wissler and later by Brotzen (1942, p. 15), the character of *Discorbis vesicularis* (Lamarck), the genotype of the genus, is very uncertain.

[1] This presupposes that Hofker is correct in placing *R. bertheloti* and *R. globularis* in the same genus. This question is discussed by Hornibrook and Vella (1954, The Micropaleontologist, vol. 8, no. 1, p. 26).

This in itself is not sufficient to discard the name *Discorbis* as they maintain, but the figures of *D. vesicularis* obviously do not represent a form similar to the majority of species placed in that genus. Hence an entirely wrong concept of the genus *Discorbis* has been erected on a very shaky structure. It seems best not to speculate further on the real character of *D. vesicularis* and its place in the classification until the type is studied. The recent definition of *Discorbis* given by Bermudez (1952, p. 32) is not borne out by the figures of *D. vesicularis*. *Rosalina* appears to be closely related to *Cibicidina* Bandy and *Hanzawaia* Asano.

R. bertheloti occurs in traverses IV-VI, VIII-XI chiefly between the depths of 100 m. and 265 m. There are a few shoaler occurrences, and two deeper than 900 m. probably representing displaced specimens. Frequencies are usually less than 1 per cent occasionally as high as 3 per cent.

Rosalina cf. concinna (H. B. Brady)
(Plate 8, figures 17, 18)

Discorbina concinna H. B. Brady, 1884, Rept. Voy. CHALLENGER, Zool. vol. 9, p. 646, pl. 90, figs. 7, 8.

The specimens are very similar to Brady's figured ones and may be identical. They appear, however, to be bigger and more finely perforate, having a maximum diameter of 0.36 mm. Brady reports a diameter of 0.25 mm. The species differs from *R. columbiensis* (Cushman) in being less coarsely perforate, and having a more sharply angled periphery.

This species occurs chiefly in traverses IV-VIII, X, XI with a few occurrences in II, III, IX. It is abundant to a depth of 180 m. but has a scattered occurrence deeper. To a depth of 30 m. frequencies may be as high as 26 per cent, then decreasing until deeper than 235 m. where they are less than 1 per cent.

Rosalina floridana (Cushman)
(Plate 8, figures 19, 20)

Discorbis floridanus Cushman, 1922, Publ. no. 311, Carnegie Instit. Washington, p. 39, pl. 5, figs. 11, 12.

This species occurs in traverses IV-VIII, IX (once), XI to a

depth of 285 m. except in V where it extends to 915 m. A maximum frequency of 15 per cent occurs at the inner end of VI but in most cases frequencies do not exceed 5 per cent to a depth of 110 m.; deeper they are less than 1 per cent.

Rosalina floridensis (Cushman)

(Plate 8, figures 28, 29)

Discorbis bertheloti (d'Orbigny) var. *floridensis* Cushman, 1930, *in* Cushman and Jarvis, Journ. Pal., vol. 4, no. 4, p. 364, pl. 33, figs. 13a-c; 1931, Bull. U. S. Nat. Mus., vol. 104, pt. 8, p. 17, pl. 3, figs. 3-5.

Cushman's figured specimens (1931) are apparently identical with ours. The figures of the fossil species (1930) appear more finely perforate but the type has not been examined.

The distribution is scattered in traverses V-IX, XI from 40 to 180 m. with frequencies mostly less than 1 per cent.

Rosalina parkerae (Natland)

(Plate 8, figures 24, 25)

Discorbis parkeri Natland, 1950, Mem. Geol. Soc. America, vol. 43, pt. 4, p. 27, pl. 6, figs. 11a-c.

Doubt is expressed by Phleger *et al* (1953, p. 40) of the validity of this species because suites of *R. williamsoni* (Parr) from the North Atlantic include specimens of this type. In the Gulf of Mexico, however, the specimens are all similar to Natland's species and do not range into the typical form of *R. williamsoni.*

R. parkerae occurs in all traverses but I-III at all depths. Frequencies are usually less than 1 per cent.

Rosalina suezensis (Said)

(Plate 8, figures 21, 26, 27)

Discorbis suezensis Said, 1949, Spec. Publ. 26, Cushman Lab. Foram. Res., p. 36, pl. 3, fig. 34.

This species is similar to *R. candeiana* d'Orbigny but is much more finely perforate. Gulf of Mexico specimens resemble topotypes of *R. suezensis* from the Gulf of Suez. The specimens referred by Phleger and Parker (1951, p. 20) to *Discorbis candeiana* should be referred to Said's species.

R. suezensis occurs in traverses III-IX, XI (once). The most concentrated distribution is to 320 m. but there is scattered occurrence mostly in IX to 914 m. There are two occurrences deeper than 2300 m. Frequencies between 1 and 6 per cent occur to 200 m.; deeper, they are usually less than 1 per cent.

Valvulineria humilis (H. B. Brady)

Truncatulina humilis H. B. Brady, 1884, Rept. Voy. CHALLENGER, Zool., vol. 9, p. 665, pl. 94, figs. 7a-c.

This species is omitted from the population counts due to its small size and superficial resemblance to juvenile planktonic specimens. It is present at many deep-water stations in the area.

Valvulineria mexicana n. sp.
(Plate 9, figures 1, 2, 3)

Valvulineria cf. *araucana* (d'Orbigny), Phleger and Parker, 1951 (not *Rosalina araucana* d'Orbigny, 1839), Mem. Geol. Soc. America, vol. 46, pt. 2, p. 25, pl. 13, figs. 7a, b, 8a, b.

Test medium in size, biconvex but more so on the ventral side, periphery rounded; chambers 6-7 in the last-formed whorl of the adult, usually 13 in all excluding the proloculus, increasing fairly rapidly in size as added, later ones slightly inflated on the dorsal side, very much so on the ventral especially toward the umbilicus where they often have a bulbous protuberance, the last-formed chamber with a large flap extending over the umbilical area, the flap of the next-to-last chamber often visible below and to one side of it, the flaps of earlier chambers occasionally visible; sutures narrow but broader in the early portion, curved on the dorsal side, somewhat less so on the ventral, later ones slightly depressed on the dorsal side, more so on the ventral especially toward the umbilicus; wall thin, rather coarsely perforate, the perforations much less closely spaced on the early chambers and often only on the outer part of the chambers of the ventral side; aperture below the extended flap of the chamber. Maximum diameter 0.4 mm.

Holotype from station 31, Lat. 28°56′ N, Long. 88°46′ W, at a depth of 373 m.

This species resembles *V. nipponica* Ishizaki but differs in the non-keeled periphery of the early portion of the last-formed whorl and in the sutures of the early portion not being raised.

It is smaller than *V. palmerae* Cushman and Todd, with a less broadly rounded periphery, less inflated chambers, and less closely spaced perforations. The species referred by Phleger *et al* (1953, p. 40) to *V.* cf. *araucana* is not referable to *V. mexicana*.

This species has a very scattered distribution in traverses II, III, VII-IX, XI deeper than 75 m. Frequencies are usually less than 5 per cent but reach a maximum of 11 per cent in III at 400 m.

Valvulineria minuta n. sp.
(Plate 9, figures 4, 5, 6)

Test small, concavo-convex with a rounded periphery and a deep umbilicus on the ventral side; chambers 7 in the last-formed whorl, 11-13 in all excluding the proloculus, increasing gradually in size as added, slightly inflated, somewhat more so on the ventral side; the last-formed chamber with a small, narrow flap extending a short way into the umbilicus; sutures narrow, very slightly curved, later ones slightly depressed on the dorsal side, somewhat more so on the ventral; wall thin, finely perforate, aperture extending from the periphery, partially concealed by the chamber-flap. Maximum diameter 0.3 mm.

Holotype from station 184, Lat. 28°45′ N, Long. 86°02.5′ W, at a depth of 274 m.

This species differs from *V. araucana* (d'Orbigny) in its somewhat less convex dorsal side, deeper umbilicus, fewer chambers with less curving sutures on the dorsal side, and finer perforations.

V. minuta occurs in traverses V-XI at all depths deeper than 75 m. and in II and IV at a few scattered localities. All frequencies are less than 1 per cent.

Gyroidinoides soldanii altiformis (R. E. and K. C. Stewart)
(Plate 9, figures 7,8)

Gyroidina soldanii d'Orbigny var. *altiformis* R. E. and K. C. Stewart, 1930, Journ. Pal., vol. 4, no. 3, p. 67, pl. 9, fig. 2.

This species occurs chiefly in traverses V-XI with single occurrences in II and III. With one exception all occurrences are deeper than 150 m. Frequencies are less than 1 per cent.

Gyroidina neosoldanii Brotzen
(Plate 9, figures 9, 10)

Rotalia soldanii H. B. Brady, 1884 (not *Gyroidina soldanii* d'Orbigny, 1826), Rept. Voy. CHALLENGER, Zool., vol. 9, p. 706, pl. 107, figs. 6, 7.

Gyroidina neosoldanii Brotzen, 1936, Sver. Geol. Unders., ser. C, no. 396, p. 158.

This species resembles *Gyroidinoides* in having its aperture extend into the umbilicus. In other respects it conforms more closely to *Gyroidina*. Specimens referred by Phleger *et al* (1953, p. 41) to *G. soldanii* var. are referable to *Gyroidinoides neosoldanii*.

The distribution is scattered in traverses III, VI, VIII-XI chiefly in IX-XI. All occurrences are deeper than 185 m. Frequencies are less than 1 per cent.

Gyroidina orbicularis d'Orbigny
(Plate 9, figures 13, 18)

Gyroidina orbicularis d'Orbigny, 1826, Ann. Sci. Nat., ser. 1, vol. 7, p. 278; Modèles, no. 13.

This is a widely distributed species in all traverses but I and IV, deeper than 165 m. Frequencies are less than 1 per cent to 585 m.; deeper, they are usually 1-5 per cent.

Eponides antillarum (d'Orbigny)
(Plate 9, figures 14, 15)

Rotalina antillarum d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminifères," p. 75, pl. 5, figs. 4-6.

This species has "sutural" foramina which according to Hofker (1951b) would place it in the genus *Gyroidina*. It is retained in *Eponides* for the reasons given under *E. repandus* (Fichtel and Moll).

E. antillarum occurs in traverses IV-VIII to a depth of 145 m. Frequencies are variable with a maximum of 9 per cent in V at 44 m.

Eponides polius Phleger and Parker
(Plate 9, figures 11, 12)

Eponides polius Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 21, pl. 11, figs. 1a, b, 2a, b.

This species has "sutural" foramina which according to Hofker (1951b) would place it in *Gyroidina* (*vide E. repandus*).

It occurs in all traverses but I and IV deeper than 585 m. Frequencies vary to a maximum of 5 per cent except in II where they reach a maximum of 8 per cent at 2788 m.

Eponides regularis Phleger and Parker
(Plate 9, figures 16, 17)

Eponides regularis Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 21, pl. 11, figs. 3a, b, 4a-c.

This species has "sutural" foramina which according to Hofker (1951b) would place it in the genus *Gyroidina* (*vide E. repandus*).

It occurs in traverses II, III, V-VII from 145 m. to 3000 m. Most frequencies are from 1-5 per cent but in III a maximum of 21 per cent occurs at 205 m.

Eponides repandus (Fichtel and Moll)
(Plate 9, figures 27, 28)

Nautilus repandus Fichtel and Moll, 1803, Test. Micr., p. 35, pl. 3, figs. a-d.

Examination of specimens from the Mediterranean and Gulf of Mexico show that the foramina are "sutural" rather than "areal" as shown by Hofker (1951b, p. 332) for specimens from Siboga material. "Sutural" foramina according to Hofker are a characteristic of the genus *Gyroidina* as contrasted to *Eponides* whose foramina are "areal." Since *Eponides repandus* is the genotype of *Eponides*, Hofker's classification is not used here pending further study.

E. repandus occurs in traverses V-IX, XI, to a depth of 185 m. Most frequencies are less than 1 per cent, occasionally higher.

Eponides tumidulus (H. B. Brady)
(Plate 9, figures 19, 24)

Truncatulina tumidula H. B. Brady, 1884, Rept. Voy. CHALLENGER, Zool., vol. 9, p. 666, pl. 95, figs. 8a-d.

This species occurs chiefly in traverses II, IX-XI with scattered occurrences in III, V, VI. Frequencies vary up to 5 per cent.

Eponides turgidus Phleger and Parker
(Plate 9, figures 22, 23)

Eponides turgidus Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 22, pl. 11, figs. 9a, b.

This species has "sutural" foramina which according to Hofker's (1951b) classification would place it in the genus *Gyroidina* (*vide E. repandus*).

It is widely distributed in all traverses but I and IV at all depths. Frequencies shoaler than 175 m. are less than 1 per cent; 1-5 per cent mostly to 1500 m.; deeper than 1500 m. a maximum of 22 per cent is reached in III at 2388 m. and frequencies are often 5-20 per cent.

Pseudoeponides umbonatus (Reuss)
(Plate 9, figures 20, 21)

Rotalina umbonata Reuss, 1851, Zeitschr. deutsch. Geol. Ges., vol. 3, p. 75, pl. 5, figs. 35a-c.

Supplementary apertures are frequently observed on the dorsal side of the specimens but the ventral ones described by Uchio (1953, p. 157) are obscure. Small specimens possibly referable to *Eponides tenera* (H. B. Brady) are included with this species in the population counts. Supplementary apertures were not observed in these specimens.

These forms are widely distributed in all traverses but I and IV. Frequencies are less than 1 per cent to a depth of 875 m.; deeper they are often 1-5 per cent.

Buccella hannai (Phleger and Parker)
(Plate 9, figures 25, 26)

Eponides hannai Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 21, pl. 10, figs. 11a, b, 12a, b, 13a, b, 14a, b.

This species occurs in traverses IV-VIII to a depth of 185 m. Frequencies to 40 m. are usually 1-2 per cent; deeper they are less than 1 per cent.

Osangularia cultur (Parker and Jones)
(Plate 9, figures 29, 30)

Planorbulina cultur Parker and Jones, 1865, Philos. Trans. Roy. Soc. London, vol. 155, p. 421, pl. 19, fig. 1.

This species occurs in all traverses but I and IV deeper than 400 m. Frequencies are 1-5 per cent to a depth of 2000 m.; deeper they are usually less than 1 per cent.

"Rotalia" beccarii (Linné) variants

(Plate 10, figures 1, 2, 5, 6)

Nautilus beccarii Linné, 1758, Syst. Nat. ed. 10, p. 710.

The variants of this species are lumped together here as they are all confined to very shallow water in the area and do not show any individual distributions in the open-ocean environment represented here. A finer grid of sampling might reveal a more variable distribution.

The distribution is in traverses I-VIII shoaler than 125 m. At the inner ends of the traverses frequencies may be as high as 34 per cent but quickly reduce to 1-5 per cent, and in most cases deeper than 70 m. are less than 1 per cent.

"Rotalia" translucens Phleger and Parker

(Plate 10, figures 3, 7)

"Rotalia" translucens Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 24, pl. 12, figs. 11a, b, 12a, b.

This is a widely distributed species in all traverses but I. It usually occurs deeper than 220 m. but there are occurrences as shoal as 60 m. Frequencies from 220 to 735 m. are often 5-20 per cent with a maximum of 27 per cent. Deeper than 735 m. they do not exceed 5 per cent and decrease until deeper than 1700 m. where they are usually less than 1 per cent.

Höglundina elegans (d'Orbigny)

(Plate 10, figures 4, 8)

Rotalia (*Turbulina*) *elegans* d'Orbigny, 1826, Ann. Sci. Nat., vol. 7, p. 276, no. 54.

This is a widely distributed species in traverses II, V-XI deeper than 65 m. Frequencies are less than 1 per cent to a depth of 345 m.; 1-5 per cent deeper, with a few higher frequencies deeper than 1300 m. The maximum is 25 per cent in X at 2150 m.

Siphonina bradyana Cushman
(Plate 10, figures 9, 10)

Siphonina bradyana Cushman, 1927, Proc. U. S. Nat. Mus., vol. 72, art. 20, p. 11, pl. 1, figs. 4a-c.

This species occurs in traverses VI-XI from 45 m. to 650 m. The occurrence in X is a single one at 950 m. Most frequencies are less than 1 per cent.

Siphonina pulchra Cushman
(Plate 10, figures 11, 12)

Siphonina pulchra Cushman, 1919, Carnegie Instit. Washington, Publ. 291, p. 42, pl. 14, figs. 7a-c.

The distribution is chiefly in traverses V-IX, XI to a depth of 640 m. There is a single occurrence in II at 2000 m. probably representing displacement. Most frequencies are less than 1 per cent with a few as high as 2 per cent between 100 and 300 m.

Cancris oblonga (Williamson)
(Plate 10, figures 13, 14)

Rotalina oblonga Williamson, 1858, Rec. Foram. Great Britain, p. 51, pl. 4, figs. 98-100.

Included in the population counts with this species are specimens of *Cancris sagra* (d'Orbigny) (Plate 10, figures 15, 21). The two species appear to have the same overall distribution.

The distribution is in traverses I (once), IV-XI to a depth of 255 m. There are a few occurrences deeper than 915 m. in X and XI probably representing displaced specimens. Frequencies are less than 1 per cent except between 35 m. and 145 m. where they reach a maximum of 2 per cent.

Family AMPHISTEGENIDAE

Asterigerina carinata d'Orbigny
(Plate 10, figures 16, 17)

Asterigerina carinata d'Orbigny, 1839, in De la Sagra, Hist. Phys. Pol. Nat. Cuba, "Foraminifères," p. 118, pl. 5, fig. 25; pl. 6, figs. 1, 2.

This species occurs in traverses IV-VIII, XI (once) to a depth of 185 m. Frequencies shoaler than 85 m. are high, reaching a maximum of 31 per cent although frequently much lower. Deeper than 100 m. they are usually less than 1 per cent.

Amphistegina spp.

It is probable that most, or all, of the specimens are referable to *A. lessonii* d'Orbigny but owing to the weathered condition of many of them it is impossible to be sure.

The distribution is in traverses IV-XI to a depth of 240 m. though the main occurrence is not deeper than 150 m. There are a few occurrences in XI deeper than 1700 m. probably representing displaced specimens. Frequencies shoaler than 200 m. vary to a maximum of 50 per cent although usually less than 20 per cent; deeper they are less than 1 per cent.

Family CASSIDULINIDAE

Epistominella decorata (Phleger and Parker)
(Plate 10, figures 18, 19)

Pseudoparrella decorata Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 28, pl. 15, figs. 4a, b, 5a, b.

This is a deep-water species occurring in all traverses but I and IV usually deeper than 1000 m. though with a few occurrences as shoal as 820 m. and single occurrences at 155 m. and 600 m. Frequencies deeper than 1100 m. are high, usually over 5 per cent and reaching a maximum of 22 per cent.

Epistominella exigua (H. B. Brady)
(Plate 10, figures 22, 23)

Pulvinulina exigua H. B. Brady, 1884, Rept. Voy. CHALLENGER, Zool., vol. 9, p. 696, pl. 103, figs. 13, 14.

This is a widely distributed species in all traverses but I and IV deeper than 220 m. Frequencies are usually high especially between 550 m. and 960 m. where they reach a maximum of 16 per cent. Outside these limits they do not exceed 5 per cent and deeper than 1400 m. are often less than 1 per cent.

Epistominella rugosa (Phleger and Parker)
(Plate 10, figures 24, 25)

Pseudoparrella rugosa Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 28, pl. 15, figs. 8a, b, 9a, b.

This species occurs chiefly in traverses V-XI, with single occurrences in II and III; deeper than 250 m. most frequencies are 1-4 per cent except in IX where they are 11 per cent at 320-421 m.

Epistominella vitrea Parker
(Plate 10, figures 20, 26)

Epistominella vitrea Parker, *in* Parker, Phleger and Peirson, 1953, Spec. Publ. 2, Cushman Found. Foram. Res., p. 9, pl. 4, figs. 34-36, 40, 41.

Some of the specimens referred to *E. exigua* by Phleger and Parker (1951, p. 28) may be referable to *E. vitrea.*

This species is widely distributed in traverses III-XI with a single occurrence in II. It is found at all depths. Shoaler than 100 m. frequencies are variable reaching a maximum of 34 per cent; deeper, they are usually less than 1 per cent.

Stetsonia n. gen.

Genotype: *Stetsonia minuta* n. sp.

Test calcareous, perforate, slightly trochoid; almost completely involute; aperture elongate in the apertural face, in the plane of coiling, slightly ventral of the periphery.

This genus is closely related to *Epistominella* but differs in being almost completely involute. In the genotype one or two chambers of the second whorl are sometimes visible on the dorsal side. The genus is at present monotypic so that variations of the amount of test which may be evolute cannot be delimited here, except to say that the chambers are not all visible on the dorsal side, as in *Epistominella,* and probably that only a small amount of the second whorl might be visible. This genus is considered to have developed from *Epistominella* and is at present unknown as fossil.

Stetsonia minuta n. sp.
(Plate 10, figures 27, 28, 29)

Test small, compressed, with a narrowly rounded periphery; chambers 8 or 9 in the last-formed whorl, very slightly inflated; sutures slightly curved, slightly depressed; wall thin, somewhat translucent, finely perforate; aperture elongate, narrow, slightly ventral of the periphery, with a narrow lip. Maximum diameter: 0.18 mm.

Holotype from station 218, Lat. 29°40′ N, Long. 88°28.5′ W, at a depth of 42 m.

This species is usually completely involute, but occasionally one or two chambers of the second whorl are visible on the dorsal side. Its involute character differentiates it from species of the genus *Epistominella* to which it is most closely related.

This species occurs in all traverses but I at all depths. Frequencies are usually less than 1 per cent.

Cassidulina carinata Silvestri
(Plate 10, figure 30)

Cassidulina laevigata d'Orbigny var. *carinata* Silvestri, 1896, Accad. Pont. N. Lincei, Mem. 12, p. 104, pl. 2, fig. 10.

Gulf of Mexico specimens are very similar to those from the Pliocene of Siena, Italy, but have a larger clear area in the center. This is true also of specimens observed from the North Atlantic.

This species has a rather scattered occurrence in traverses III, V-X at all depths. Frequencies are variable up to a maximum of 17 per cent. They are usually much lower, not exceeding 5 per cent and often less than 1 per cent.

Cassidulina aff. crassa d'Orbigny
(Plate 10, figure 31)

Cassidulina crassa d'Orbigny, 1839, Voy. Amer. Mérid., vol. 5, pt. 5, "Foraminifères," p. 56, pl. 7, figs. 18-20.

The specimens found in this area are less compressed and more lobulate than that figured by Brady (1884, pl. 54, fig. 5). The species as it occurs in the northwestern Gulf of Mexico conforms more closely to Brady's interpretation of d'Orbigny's species.

The distribution is chiefly in traverses VI-XI, with a few occurrences in II, III, V, deeper than 135 m. Frequencies are usually less than 1 per cent, shoaler than 500 m. sometimes 1-4 per cent.

Cassidulina curvata Phleger and Parker
(Plate 11, figure 1)

Cassidulina curvata Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 26, pl. 14, figs. 5a, b.

This species occurs in traverses II (twice), V-XI, at all depths deeper than 60 m. except for one occurrence at 35 m. To a depth of 600 m. frequencies are usually 1-5 per cent; deeper, they are less than 1 per cent.

Cassidulina laevigata d'Orbigny
(Plate 11, figure 2)

Cassidulina laevigata d'Orbigny, 1826, Ann. Sci. Nat., vol. 7, p. 282, no. 1, pl. 15, figs. 4, 5; Modèles, no. 41.

This species has a scattered distribution in traverses V-VIII, X, XI. Frequencies are less than 1 per cent except for a few shoaler than 150 m. which reach a maximum of 6 per cent.

Cassidulina neocarinata Thalmann
(Plate 11, figure 3)

Cassidulina laevigata d'Orbigny var. *carinata* Cushman, 1922, (not Silvestri, 1896), Bull. U. S. Nat. Mus., vol. 104, pt. 3, p. 124, pl. 25, figs. 6, 7.

Cassidulina neocarinata Thalmann, 1950, Contr. Cushman Found. Foram. Res., vol. 1, pts. 3, 4, p. 44.

This species occurs in traverses II, V-XI, deeper than 75 m. Between 120 and 600 m. frequencies are usually 1 per cent or more reaching a maximum of 11 per cent. Deeper than 600 m. they are usually less than 1 per cent. The occurrences deeper than 950 m. are very scattered.

Cassidulina subglobosa H. B. Brady and variants
(Plate 11, figures 4, 5, 6, 7, 8, 9)

Cassidulina subglobosa H. B. Brady, 1881, Quart. Journ. Micr. Sci., n. s., vol. 21, p. 60; 1884, Rept. Voy. CHALLENGER, Zool., vol. 9, p. 430, pl. 54, figs. 17a-c.

There are several variants present in the area, as well as the typical form (Pl. 11, figs. 4, 5). A small compressed variant (Pl. 11, fig. 6) is similar to var. *depressa* Asano and Nakamura, and has a widespread distribution. A small globose form (Pl. 11, figs. 8, 9) with a sharply curved aperture in the juvenile specimens resembles var. *horizontalis* Cushman and Renz. This form and the large typical specimens seem to occur in deep water only. All these variants appear to merge into one another, and since in counting it was impossible to always differentiate them accurately it seemed best not to attempt to do so.

This is a very abundant, widely distributed group occurring in all traverses but I although chiefly in V-XI. Deeper than about 80 m. frequencies are usually between 5 and 20 per cent (maximum 23 per cent); deeper than about 2300 m. frequencies are often less than 5 per cent.

Cassidulinoides tenuis Phleger and Parker
(Plate 11, figure 14)

Cassidulinoides tenuis Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 27, pl. 14, figs. 14a, b, 15-17.

This species occurs in traverses II (twice), VI-XI, deeper than 255 m. Deeper than 1100 m. occurrences are very scattered. All frequencies are less than 1 per cent.

Ehrenbergina spinea Cushman
(Plate 11, figure 12)

Ehrenbergina spinea Cushman, 1935, Smithsonian Misc. Coll., vol. 91, no. 21, p. 8, pl. 3, figs. 10, 11.

This species occurs only in traverses IX-XI. Four occurrences are between 135 m. and 255 m., and two are at 914 m. and 950 m. The occurrences between 139 m. and 155 m. have frequencies of 3-6 per cent, the others are less than 1 per cent. The deep occurrences probably represent displaced specimens.

Family CHILOSTOMELLIDAE

Rotamorphina laevigata (Phleger and Parker)
(Plate 11, figures 10, 11)

Valvulineria laevigata Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 25, pl. 13, figs. 11a, b, 12a, b.

Eponides exigua Cushman, 1931 (not *Pulvinulina exigua* H. B. Brady, 1884), Bull. U. S. Nat. Mus., vol. 104, pt. 8, p. 44, pl. 10, figs. 1, 2.

Valvulineria sp. Parker, 1948, Bull. Mus. Comp. Zool., vol. 100, no. 2, p. 240, pl. 4, figs. 13a, b.

This species occurs in all traverses but I and IV, but chiefly in V-XI, deeper than 100 m. Frequencies are usually less than 1 per cent.

Chilostomella oolina Schwager
(Plate 11, figure 15)

Chilostomella oolina Schwager, 1878, Boll. Com. Geol. Ital., vol. 9, p. 527, pl. 1, fig. 16.

This species occurs in traverses II, III, V-VIII, X (twice), XI (once), deeper than 125 m. Frequencies are usually less than 1 per cent but occasionally as high as 2 per cent.

Seabrookia earlandi Wright
(Plate 11, figure 13)

Seabrookia earlandi Wright, 1891, Proc. Roy. Irish Acad., ser. 3, vol. 1 (1889-91), no. 4, p. 477, pl. 20, figs. 6, 7.

This species occurs in traverses IV (once), V-XI at all depths but chiefly 100-2300 m. Frequencies are less than 1 per cent.

Pullenia bulloides (d'Orbigny)
(Plate 11, figure 17)

Nonionina bulloides d'Orbigny, 1826, Ann. Sci. Nat., vol. 7, p. 293; 1846, Foram. Bass. Tert. Vienne, p. 107, pl. 5, figs. 9, 10.

This is a widely distributed species in all traverses but I and IV, deeper than 145 m. Shoaler than 900 m. frequencies are less than 1 per cent; deeper, they may be as high as 2 per cent.

Pullenia quinqueloba (Reuss)
(Plate 11, figure 16)

Nonionina quinqueloba Reuss, 1851, Zeitschr. deutsch. Geol. Ges., vol. 3, p. 71, pl. 5, fig. 31.

This species occurs in all traverses but I and IV, deeper than 100 m. Shoaler than 530 m. all frequencies are less than 1 per cent; deeper, they may be as high as 2 per cent.

Pullenia sp.
(Plate 11, figures 20, 24)

This is a small species with a maximum diameter of 0.3 mm. It is compressed with a narrowly rounded periphery and has seven chambers in the last-formed whorl. It most closely resembles *P. trinitatensis* Cushman and Stainforth but is smaller and more compressed, especially in the initial portion. It is probably a new species but there is not sufficient material to describe it adequately.

It occurs in traverses II, III (once), VI (once), VII (once), VIII-XI, deeper than 960 m. Frequencies are less than 1 per cent except in II where they are 2-3 per cent from 1900 m. to 2800 m.

Sphaeroidina bulloides d'Orbigny
(Plate 11, figure 18)

Sphaeroidina bulloides d'Orbigny, 1826, Ann. Sci. Nat., vol. 7, p. 267, no. 1; Modèles, no. 65.

This is a widely distributed species in all traverses but I and IV, deeper than 100 m. Between 180 m. and 1000 m. frequencies are usually 1-5 per cent but reach a maximum of 9 per cent in II at 314 m. Outside these limits they are less than 1 per cent.

Sphaeroidina compacta Cushman and Todd
(Plate 11, figure 19)

Sphaeroidina compacta Cushman and Todd, 1949, Contr. Cushman Lab. Foram. Res., vol. 25, pt. 1, p. 19, pl. 4, figs. 14a, b.

This species has a very scattered distribution from 120 m. to 3250 m. in traverses II, VI, VIII, X, XI. Frequencies are less than 1 per cent.

Family ANOMALINIDAE

Anomalinoides mexicana n. sp.
(Plate 11, figures 21, 22, 23)

Test small, biconvex, involute, ratio of width to length 3: 4, periphery broadly rounded, non-lobulate in early portion, slightly lobulate in later portion of the test; chambers 7 or 8 in last-formed whorl, non-inflated in the early portion, last-formed one or two in the adult slightly inflated; sutures narrow, flush with the test except for the last ones in the adult which are slightly depressed, slightly curved; wall thin, somewhat translucent, finely but conspicuously perforate; aperture extending from the umbilicus to the periphery on the ventral side, with a distinct lip. Maximum diameter 0.4 mm.

Holotype from station 184, Lat. 28°45′ N, Long. 86°02.5′ W, at a depth of 274 m.

This species has fewer chambers than *A. plummerae* Brotzen, is more finely perforate, has non-elevated sutures in the early portion of the test, and is not round in outline.

A. mexicana occurs in traverses II (once), III (once), V-X, XI (once) deeper than 220 m. Frequencies are less than 1 per cent.

Planulina ariminensis d'Orbigny
(Plate 11, figure 27, 30)

Planulina ariminensis d'Orbigny, 1826, Ann. Sci. Nat., vol. 7, p. 280, no. 1, pl. 14, figs. 1-3 bis; Modèles, no. 49.

This species occurs in traverses V (once), VI-XI from 155 m. to 2550 m. Deeper than 740 m. the occurrence is very scattered. Frequencies are usually less than 1 per cent; the maximum frequency is 4 per cent.

Planulina exorna Phleger and Parker
(Plate 11, figures 28, 29)

Planulina exorna Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 32, pl. 18, figs. 5a, b, 6a, b, 7a, b, 8a, b.

This is a very abundant shallow-water species. It occurs in traverses II (once), IV-IX, XI (once) to a depth of 255 m., except in VIII where it extends to 365 m. At less than 100 m. frequencies are greatest reaching a maximum of 43 per cent, but usually less than 20 per cent. They decrease seaward until deeper than 150 m. where they are less than 1 per cent.

Planulina foveolata (H. B. Brady)
(Plate 11, figures 25, 26)

Anomalina foveolata H. B. Brady, 1884, Rept. Voy. CHALLENGER, Zool., vol. 9, p. 674, pl. 94, figs. 1a-c.

This species occurs in traverses II (once), V-IX, XI, from 75 m. to 345 m. except in V where it extends to 530 m. Frequencies from 120 m. to 270 m. may be as high as 5 per cent; elsewhere they are less than 1 per cent.

Laticarinina pauperata (Parker and Jones)
(Plate 12, figure 3)

Pulvinulina repanda var. *menardii* subvar. *pauperata* Parker and Jones, 1865, Philos.Trans., Roy. Soc. London, vol. 155, p. 395, pl. 16, figs. 50, 51.

This species occurs in all traverses but I and IV, deeper than 255 m. Most frequencies are less than 1 per cent but deeper than 915 m. they may be as high as 2 per cent.

Cibicides corpulentus Phleger and Parker

(Plate 12, figures 4, 8)

Cibicides robustus Phleger and Parker, 1951 (not Le Calvez, 1949), Mem. Geol. Soc. America, vol. 46, pt. 2, p. 31, pl. 17, figs. 1a, b, 2a, b, 3a, b, 4a, b.

Cibicides corpulentus Phleger and Parker, 1952, Contr. Cushman Found. Foram. Res., vol. 3, pt. 1, p. 14.

This species occurs in all traverses but I and IV, chiefly in V-XI, from 100 m. to 1800 m. There is a single occurrence at about 3000 m. Frequencies are less than 1 per cent.

Cibicides deprimus Phleger and Parker

(Plate 12, figures 1, 2)

Cibicides deprimus Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 29, pl. 15, figs. 16a, b, 17a, b.

This species occurs in traverses IV-XI to a depth of 915 m. with a few scattered occurrences to 2600 m. Shoaler than 150 m. frequencies are usually 1-5 per cent but reach a maximum of 19 per cent; deeper, they are less than 1 per cent.

Cibicides aff. floridanus (Cushman)

(Plate 12, figures 5, 9)

Truncatulina floridana Cushman, 1918, Bull. U. S. Geol. Surv., vol. 676, p. 62, pl. 19, fig. 2.

This species as defined here includes the same range of varying forms as occurs in the northwestern Gulf of Mexico. Included also are forms which were designated by Phleger and Parker (1951, p. 32, pl. 17, figs. 10, 11) as *Cibicides* sp. 1. The variant forms are not all figured here but may be found in Phleger and Parker (1951, pl. 16, figs. 1-4).

This is a widely distributed group in all traverses but I and IV from 35 m. to 1750 m. with a single occurrence at 2150 m. Frequencies are usually 1-5 per cent. Deeper than 1400 m. and shoaler than 60 m. they are less than 1 per cent.

Cibicides io Cushman
(Plate 12, figures 6, 7)

Cibicides pseudoungeriana (Cushman) var. *io* Cushman (part), 1931, Bull. U. S. Nat. Mus., vol. 104, pt. 8, p. 125, pl. 23, fig. 1 (not fig. 2).

As has been stated previously by Phleger and Parker (1951, p. 30), Cushman has figured two species under this name. Figure 2 in the above reference was erroneously labelled the holotype in the explanation of plates. Figure 1 represents the holotype as shown by its catalogue number and the designation given by Cushman in the text.

This species occurs in traverses V-VIII from 50 to 150 m. Frequencies are usually less than 1 per cent.

Cibicides kullenbergi Parker
(Plate 12, figures 10, 11)

Cibicides kullenbergi Parker, 1953, in Phleger, Parker and Peirson, Repts. Swedish Deep-Sea Exped., vol. 7, no. 1, p. 49, pl. 11, figs. 7, 8.

This species has scattered occurrences in traverses II, III, V and more consistent ones in VI-XI deeper than 580 m., with the greatest deeper than 1000 m. Frequencies are usually less than 1 per cent but may be as high as 2 per cent.

Cibicides mollis Phleger and Parker
(Plate 12, figures 12, 15)

Cibicides mollis Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 30, pl. 16, figs. 7a, b, 8a, b, 9a, b.

This species occurs in traverses V-VIII, XI from 50 to 185 m. There is a single occurrence at about 455 m. Frequencies are less than 1 per cent.

Cibicides protuberans n. sp.
(Plate 12, figures 13, 14, 16)

Test large, plano-convex, with 3-3½ whorls, lobulate in the adult and often very irregular in outline, regular in juvenile specimens, periphery keeled in the early chambers, later narrowly rounded, with a clear protuberant umbo; chambers 8-12 in the adult whorl; sutures slightly limbate in the early portion, later depressed, curved; wall thin, somewhat translucent, with large to medium perforations sometimes very closely spaced

and sometimes irregularly scattered; aperture peripheral extending for a short distance on the evolute side. Maximum diameter 1.3 mm.

Holotype from station 116, Lat. 25°43′ N, Long. 84°13′ W, at a depth of 155 m.

This species most closely resembles *C. fletcheri* Galloway and Wissler but is larger, less convex on the involute side, and has a more protuberant umbo.

C. protuberans occurs in traverses IV-XI to a depth of 1850 m. The lower range is progressively deeper to the east: in IV, 42 m.; in V, 100 m.; in VI, 183 m.; in VII, 878 m.; in VIII, 585 m.; in IX, 420 m.; in X, 1317 m.; in XI, 1829 m. Deep occurrences in X and XI and possibly elsewhere probably represent displaced specimens. Shoaler than 200 m. frequencies are variable with a maximum of 21 per cent. They decrease deeper, and below 320 m. are less than 1 per cent.

Cibicides robertsonianus (H. B. Brady)
(Plate 13, figures 2, 5)

Truncatulina robertsonianus H. B. Brady, 1881, Quart. Journ. Micr. Sci., vol. 21, p. 65; 1884, Rept. Voy. CHALLENGER, Zool., vol. 9, p. 664, pl. 95, figs. 4a-c.

In traverses II and III this species occurs deeper than 1200 m.; in V deeper than 914 m.; in VI-IX deeper than 275-585 m.; in X deeper than 950 m., and in XI deeper than 155 m. Deeper than 1000 m. frequencies are usually 1-5 per cent; shoaler they are usually less than 1 per cent.

Cibicides rugosa Phleger and Parker
(Plate 13, figures 1, 4)

Cibicides rugosa Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 31, pl. 17, figs. 5a, b, 6a, b.

This species occurs in traverses II (once), V-XI, from 575 m. to 2650 m. Frequencies are less than 1 per cent.

Cibicides umbonatus Phleger and Parker
(Plate 12, figure 17, 18)

Cibicides umbonatus Phleger and Parker, 1951, Mem. Geol. Soc. America, vol. 46, pt. 2, p. 31, pl. 17, figs. 7a, b, 8a, b, 9a, b.

This species occurs in traverses V-IX, from 35 m. to 600 m.

There is one occurrence in XI at 914 m. probably representing displacement. Frequencies shoaler than 150 m. and deeper than 550 m. are less than 1 per cent; between these limits they may be as high as 5 per cent.

Cibicides wuellerstorfi (Schwager)
(Plate 13, figure 3, 6)

Anomalina wuellerstorfi Schwager, 1866, Novara Exped., Geol. Theil., vol. 2, p. 258, pl. 7, figs. 105, 107.

I have previously referred this species to the genus *Planulina*. Since, however, it has an involute and an evolute side instead of being almost completely planispiral, it seems more logical to place it in *Cibicides*.

It occurs in all traverses but I and IV deeper than 800 m. except in traverses VII and VIII where it occurs deeper than 455 m. and 580 m. respectively. Deeper than 1000 m. frequencies are usually greater than 5 per cent and may be as high as 47 per cent; elsewhere they are usually 1-5 per cent but occasionally higher or lower.

Cibicidina strattoni (Applin)
(Plate 13, figures 8, 11)

Truncatulina americana Cushman var. *strattoni* Applin, 1925, *in* Applin, Ellisor and Kniker, Bull. Amer. Assoc. Petr. Geol., vol. 9, no. 1, p. 99, pl. 3, fig. 3.

C. concentrica (Cushman) (Plate 13, figures 7, 10) is often found occurring with this species but seldom in as great abundance. The two species appear to have the same distribution and have been combined in the population counts.

O. L. Bandy has pointed out to me (personal communication) that the genus *Cibicidina* is probably synonymous with *Hanzawaia* Asano. I have previously pointed out its resemblance also to *Rosalina* d'Orbigny.

The distribution is in traverses III (once), IV-VIII, IX (twice), XI (once) to a depth of 150 m. with a scattered occurrence to 235 m. There is a single occurrence at 914 m. in IX probably representing displacement. Frequencies at less than 100 m. are usually greater than 1 per cent, frequently greater than 5 per cent, and may be as high as 35 per cent. Deeper, frequencies decrease until at 150 m. they are less than 1 per cent.

Family PLANORBULINIDAE

Planorbulina mediterranensis d'Orbigny
(Plate 13, figure 9)

Planorbulina mediterranensis d'Orbigny, 1826, Ann. Sci. Nat., vol. 7, p. 280, no. 2, pl. 14, figs. 4-6 bis.; Modèles, no. 79.

This species occurs in traverses IV (once), V-XI to a depth of 185 m. There are two occurrences in XI deeper than 1300 m. probably indicating displacement. Frequencies are usually less than 1 per cent.

Gypsina vesicularis (Parker and Jones)
(Plate 13, figure 12)

Orbitolina vesicularis Parker and Jones, 1860, Ann. Mag. Nat. Hist., ser. 3, vol. 6, p. 31, no. 5.

This species occurs in traverses VI-VIII, XI to a depth of 155 m. Frequencies are less than 1 per cent.

CONCLUSIONS

1. Five faunal depth facies boundaries occur at: 80-100 m., 130-150 m., 180-220 m., 350-600 m., and 900-1000 m. There are less distinct boundaries at 30-50 m. and 250 m. Deeper than 1000 m. there are various changes which are not concentrated at particular depths. Salinity and temperature data show changing conditions with depth and may contribute to differentiation of facies.

2. Lateral changes from west to east are marked in facies 1-4. Factors affected by the outflow of the Mississippi River including turbidity, light penetration, food supply and the chemistry of the water and sediments are probably an important influence on faunas in traverses in that area. The increase to the east of the West Indian fauna is marked and the fauna of the continental shelf appears to be largely residual. In facies 5 and 6 lateral changes are less marked.

3. Displaced specimens from shallow stations occur at deep stations especially below the escarpment running north and south along the coast of Florida.

4. Most species present in significant frequencies are represented by living specimens at stations shoaler than 200 m.; at greater depths the presence of living specimens is irregular. There appears to be an analogy in the Mississippi Delta region between the percentage of total population found living and the rate of sedimentation.

5. Planktonic populations show similar distributions in the various traverses. They combine elements of North Atlantic mid- and low-latitude faunas. The extreme annual range of surface temperatures may partially explain this. To explain the presence of *Globigerina inflata* d'Orbigny and *G. pachyderma* (Ehrenberg), an east to west coastal current along the Florida coast is postulated. Other species may be introduced from the Caribbean.

6. Planktonic faunas compose less than 10 per cent of the total population shoaler than 100 m. and 90 per cent or more deeper than 1000 m. They do not appear in the shallow stations most affected by the outflow of the Mississippi River.

7. The tests of planktonic species often show the effect of solution of calcium carbonate. The high percentage of such tests at many stations suggests that solution is fairly rapid.

8. Living planktonic specimens occur at many of the deeper stations. They probably represent forms which have fallen to the bottom and survived rather than bottom-living stages.

9. Two hundred and five species and thirteen generic and family groups are used in the analysis of faunal distributions. One new genus *Stetsonia*, and ten new species: *Anomalinoides mexicana, Bolivina lanceolata, Cibicides protuberans, "Discorbis" bulbosa, Globobulimina mississippiensis, Goësella mississippiensis, Reophax irregularis, Stetsonia minuta, Valvulineria mexicana* and *Valvulineria minuta* are described.

BIBLIOGRAPHY

ADAMS, R. M. and E. F. SORGNIT

1951. Comparison of summer and winter sea temperatures. Dept. Oceanogr., A. and M. College, Texas, Project NR 083 036, Rep't. no. 3, pp. 1-3.

BERMUDEZ, P. J.

1952. Estudio sistematico de los foraminiferos rotaliformes. Bol. Geol. Minist. Minas Hidrocarbons, vol. 2, no. 4, pp. 7-230.

BRADY, H. B.

1884. Report on the Foraminifera dredged by H. M. S. CHALLENGER during the years 1873-1876. Rept. Voy. CHALLENGER, Zool., vol. 9, pp. 1-814.

BROTZEN, F.

1942. Die Foraminiferengattung *Gavellina* nov. gen. und die Systematik der Rotaliiformes. Sver. Geol. Unders., ser. c, no. 451, pp. 5-60.

CUSHMAN, J. A.

1918-1931. The Foraminifera of the Atlantic Ocean. Bull. U. S. Nat. Mus., vol. 104, pts. 1-8.

1922. Shallow-water Foraminifera of the Tortugas region. Carnegie Instit. Washington, Publ. no. 311, pp. 3-85.

Ewing, M., G. P. Woollard, A. C. Vine and J. L. Worzel
1946. Recent studies in submarine geophysics. Bull. Geol. Soc. America, vol. 57, pp. 909-934.

Flint, J. M.
1899. Recent Foraminifera. Ann. Rept. U. S. Nat. Mus. (1897), pp. 249-349.

Fuglister, F. C.
1947. Average monthly sea surface temperatures of the western North Atlantic Ocean. Papers in Physical Oceanography and Meteorology, publ. by Mass. Instit. Techn. and Woods Hole Oceanogr. Instit., vol. 10, no. 2, pp. 5-25.

Galloway, J. J. and S. G. Wissler
1927. Pleistocene Foraminifera from the Lomita Quarry, Palos Verdes Hills, California. Journ. Pal., vol. 1, no. 1, pp. 35-87.

Hofker, J.
1951a. The toothplate-Foraminifera. Archiv. Néerland. Zool., vol. 8, no. 4, pp. 353-372.
1951b. The Foraminifera of the SIBOGA Expedition. Pt. 3. Ordo Dentata, Sub-ordines Protoforaminata, Biforaminata, Deuteroforaminata. Monograph 4a, Vitkom. Zool., Bot. Oceanogr., Geol. Geb., Nederlandsch. Oost-Indië 1899-1900, pp. 1-513.

Höglund, H.
1947. Foraminifera in the Gullmar Fjord and the Skagerak. Zool. Bidrag Uppsala, vol. 26, pp. 1-328.

Le Calvez, Y.
1949. Révision des foraminifères lutétiens du Bassin de Paris; II Rotaliidae et familles affines. France, Service Carte Géol., Mém., Paris, pp. 1-54.

Loeblich, A. R. and H. Tappan
1953. Studies of Arctic Foraminifera. Smithsonian Misc. Coll., vol. 121, no. 7, pp. 1-150.

Lowman, S. W.
1949. Sedimentary facies in Gulf Coast. Bull. Amer. Assoc. Petr. Geol., vol. 33, no. 12, pp. 1939-1997.
1951. The relationship of the biotic and lithic facies in Recent Gulf Coast sedimentation. Journ. Sed. Petr., vol. 21, no. 4, pp. 233-237.

Parker, F. L.
1952. Foraminifera species off Portsmouth, New Hampshire. Bull. Mus. Comp. Zool., vol. 106, no. 9, pp. 391-423.

PARKER, F. L., F. B PHLEGER and J. F. PEIRSON
1953. Ecology of Foraminifera from San Antonio Bay and environs, southwest Texas. Cushman Found. Foram. Res., Spec. Publ. 2, pp. 1-75.

PARR, A. E.
1935. Report on the hydrographic observations in the Gulf of Mexico and the adjacent straits made during the Yale oceanographic expedition on the MABEL TAYLOR in 1932. Bull. Bingham Oceanogr. Coll., vol. 5, art. 1, pp. 1-93.

PHLEGER, F. B
1951. Ecology of Foraminifera, northwest Gulf of Mexico. Pt. 1. Foraminifera distribution. Mem. Geol. Soc. America, vol. 46, pp. 1-88.
1952. Foraminifera ecology off Portsmouth, New Hampshire. Bull. Mus. Comp. Zool., vol. 106, no. 8, pp. 315-390.

PHLEGER, F. B and and F. L. PARKER
1951. Ecology of Foraminifera, northwest Gulf of Mexico. Pt. 2. Foraminifera species. Mem. 46, Geol. Soc. America, pp. 1-64.

PHLEGER, F. B, F. L. PARKER and J. F. PEIRSON
1953. Sediment cores from the North Atlantic Ocean. No. 1. North Atlantic Foraminifera. Repts. Swedish Deep-Sea Exped., vol. 7, pp. 3-122.

RHUMBLER, L.
1911. Die Foraminiferen (Thalomorphoren) der Plankton-Expedition, etc. Pt. 1. Systematik. Ergeb. Plankton-Exped. Humboldt-Stiftung, vol. 3, pp. 1-331.

STETSON, H. C.
1938. The sediments of the continental shelf off the eastern coast of the United States. Papers in Physical Oceanography and Meteorology, publ. by Mass. Instit. Techn. and Woods Hole Oceanogr. Instit., vol. 5, no. 4, pp. 5-48.

UCHIO, T.
1953. On some foraminiferal genera in Japan. Jap. Journ. Geol. Geogr., vol. 23, pp. 151-162.

WALTON, W. R.
1952. Techniques for the recognition of living Foraminifera. Contr. Cushman Found. Foram. Res., vol. 3, pt. 2, pp. 56-60.

Contribution No. 709, Scripps Institution of Oceanography.
Contribution No. 16, Marine Foraminifera Laboratory.
Manuscript received January, 1954.

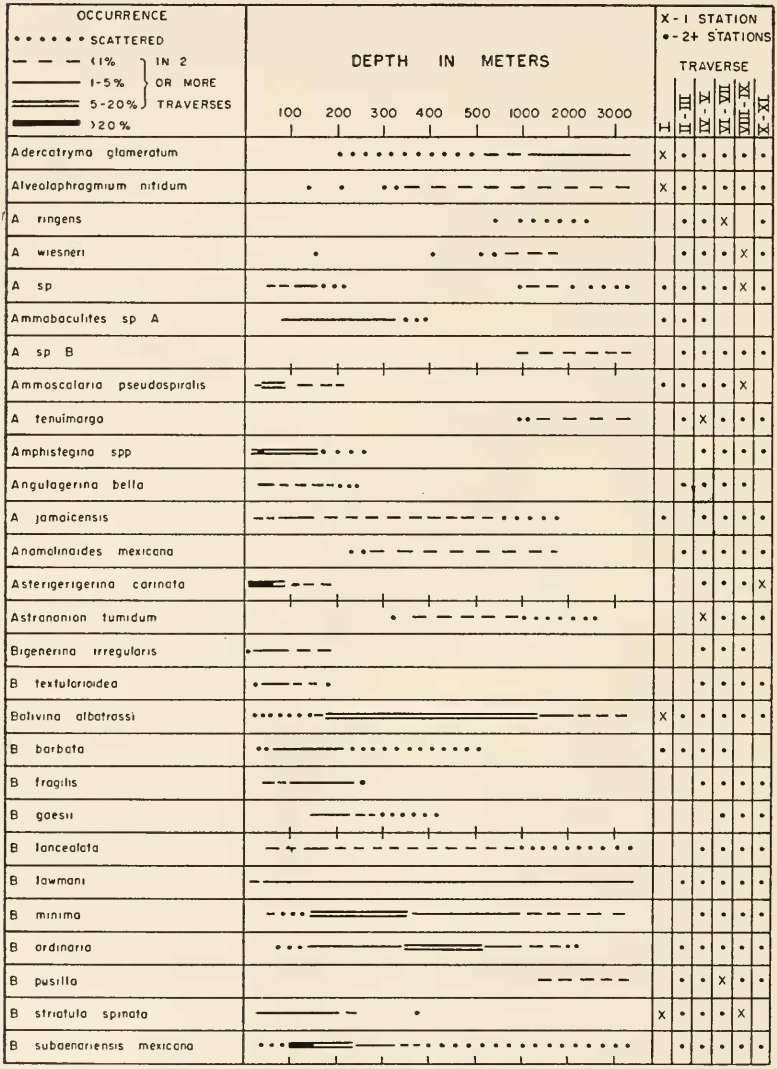

Fig. 3. Generalized distributions of benthonic Foraminifera by depth.

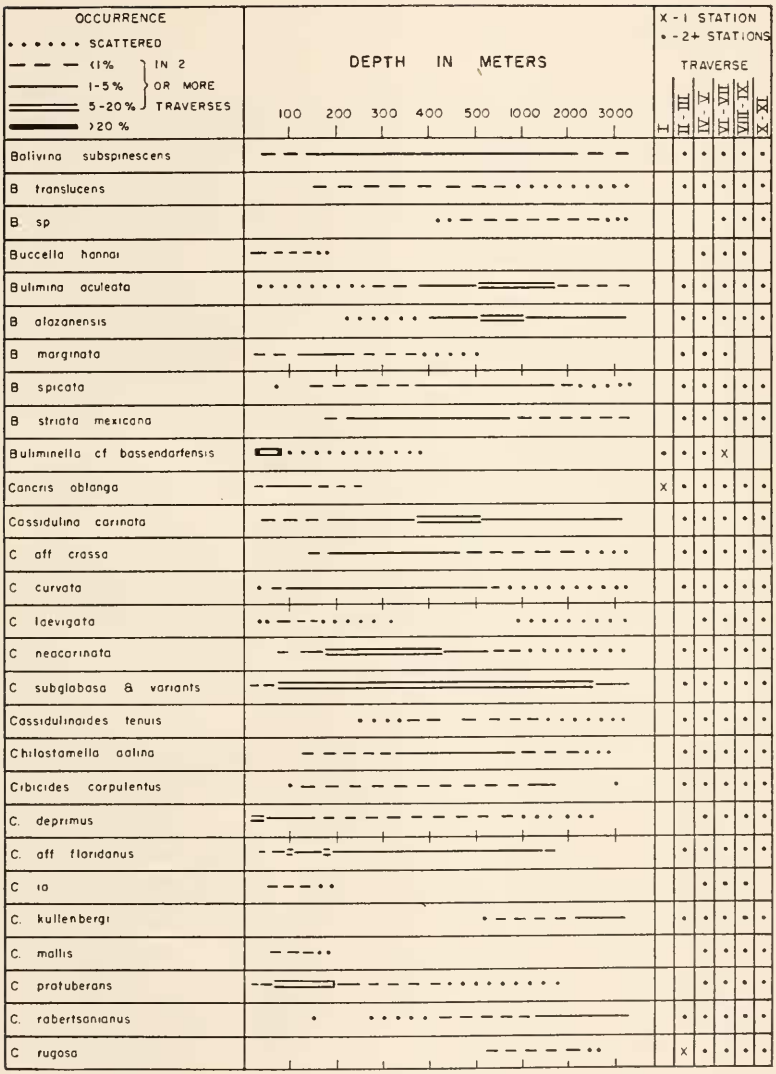

Fig. 4. Generalized distributions of benthonic Foraminifera by depth.

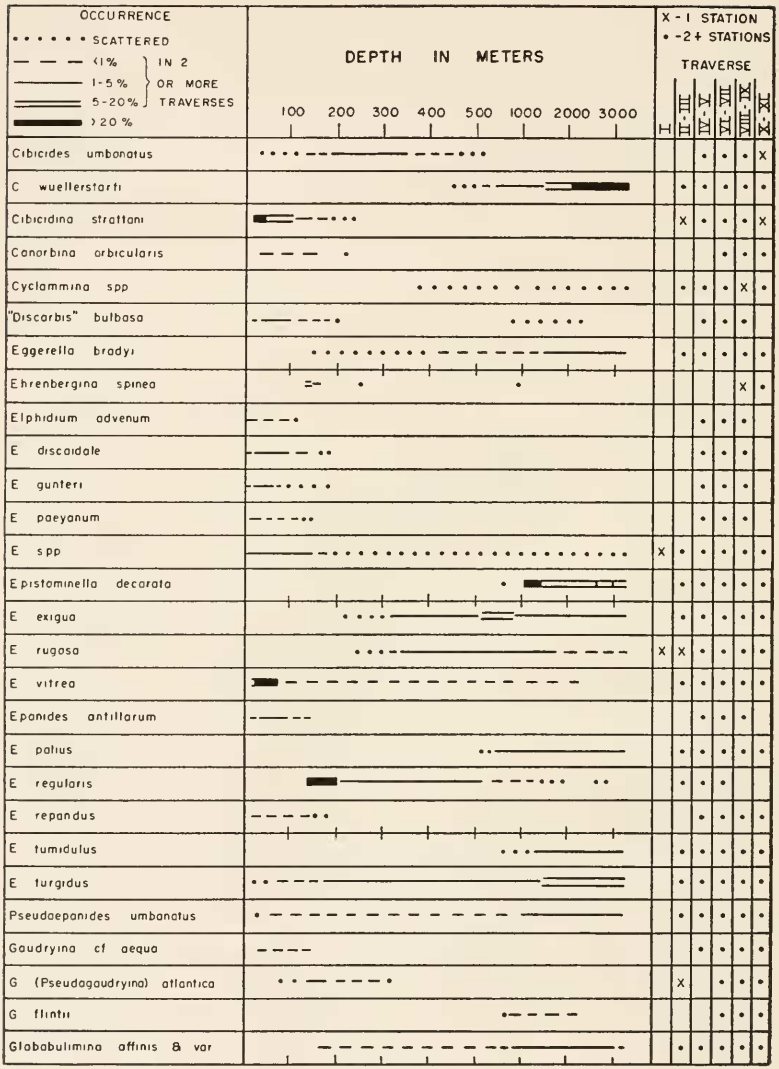

Fig. 5. Generalized distributions of benthonic Foraminifera by depth.

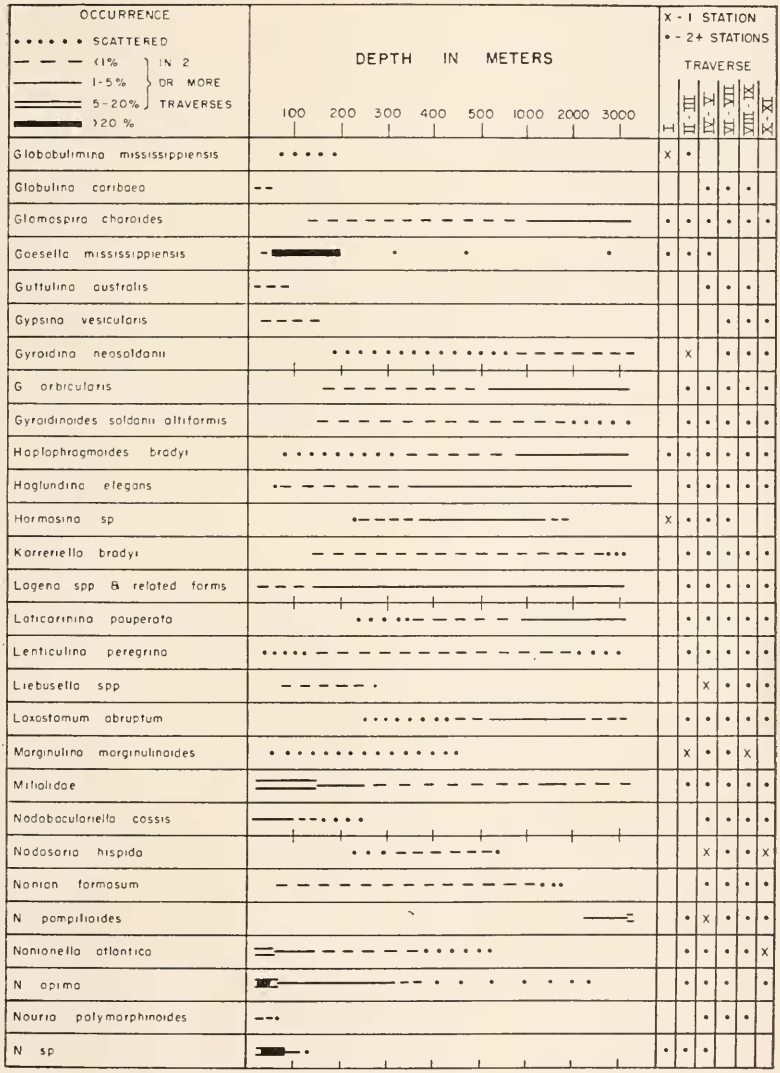

Fig. 6. Generalized distributions of benthonic Foraminifera by depth.

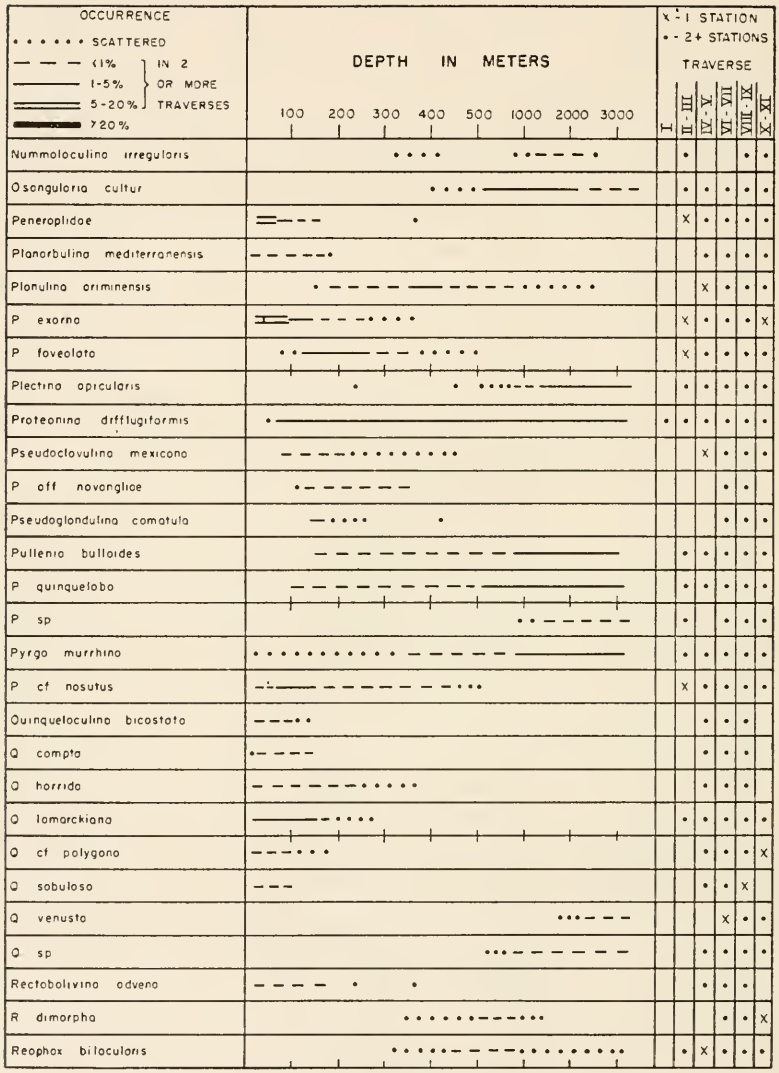

Fig. 7. Generalized distributions of benthonic Foraminifera by depth.

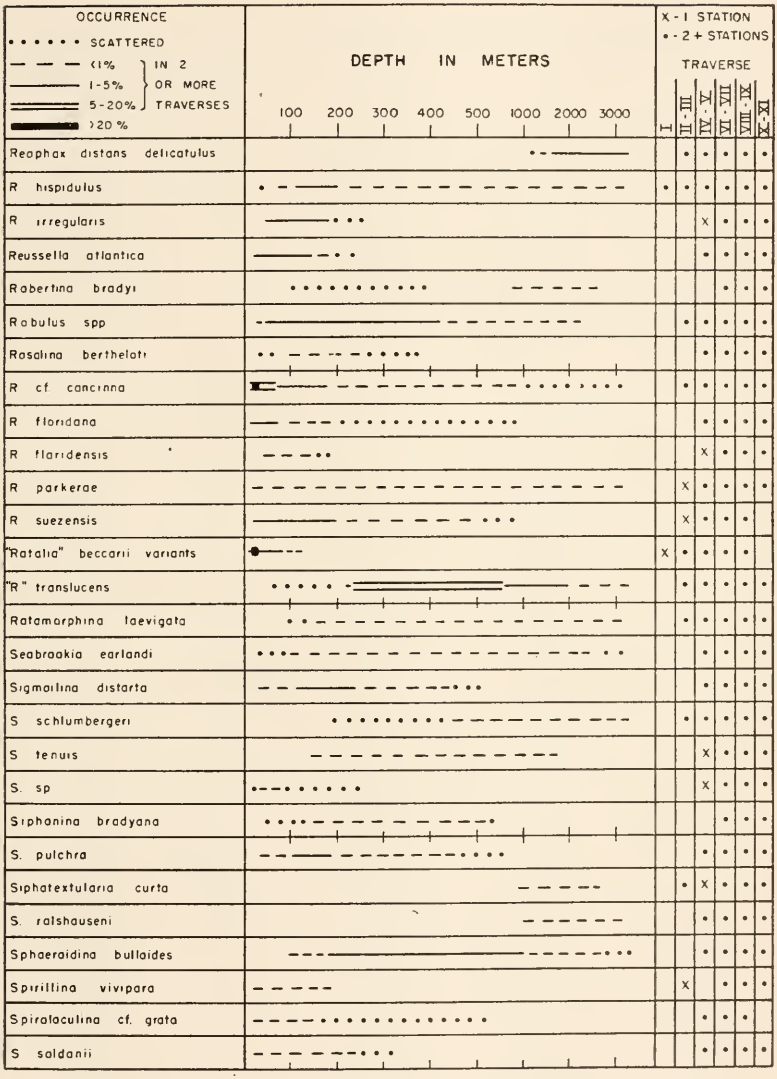

Fig. 8. Generalized distributions of benthonic Foraminifera by depth.

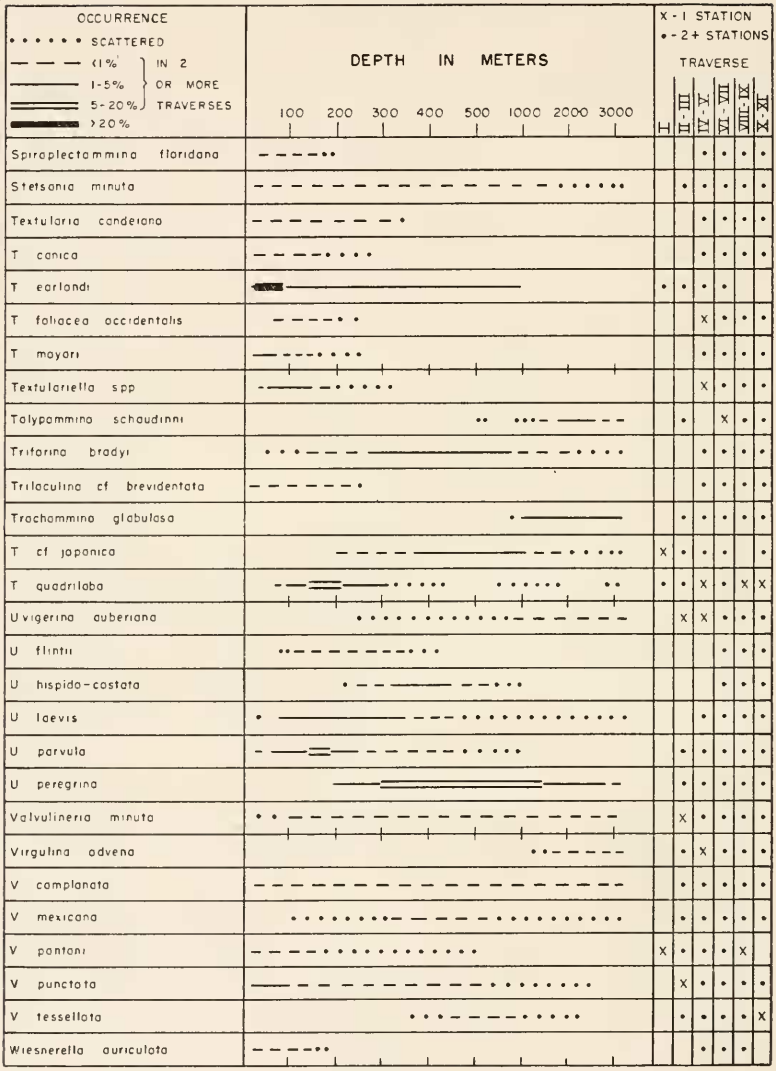

Fig. 9. Generalized distributions of benthonic Foraminifera by depth.

TABLE 3

Locations of stations giving depth and type of sampling gear used. (P — Phleger sampler, O — orange peel dredge, S — Stetson-Iselin sampler, U — underway sampler)

Station	*Sampler*	*N. Latitude*	*W. Longitude*	*Depth in Meters*
1	P	24°51′	85°58′	3237
2	P	24°45.5′	86°27′	3237
3	P	26°01′	88°03′	3017
4	P	26°07′	89°09′	2972
5	P	26°31′	89°09.5′	2788
6	P	26°58.5′	89°12′	2468
7	P	27°26′	89°14′	1875
8	P	27°37.5′	89°14.5′	1417
9	P	27°51′	89°15′	1372
10	P	28°01.5′	89°19′	1298
11	P	28°12′	89°20′	914
12	P	28°18′	89°20′	732
13	P	28°23.5′	89°20′	631
14	P	28°29′	89°22′	471
15	P	28°33.5′	89°22′	298
16	P	28°52′	89°26′	33
17	P	28°49′	89°26′	58
18	P	28°45.5′	89°27′	88
19	P	28°43′	89°26′	106
20	P	28°41′	89°25.5′	113
21	P	28°39′	89°25′	142
22	P	28°37′	89°24.5′	168
23	P	28°35′	89°24′	208
24	P	28°32.5′	89°24′	314
25	P	29°10′	88°56′	22
26	P	29°08.5′	88°55′	53
27	P	29°06′	88°53′	77
28	P	29°04.5′	88°52′	106
29	P	29°04.5′	88°52′	155
30	P	29°01′	88°49.5′	205
31	P	28°56′	88°46′	373
32	P	28°50.5′	88°42.5′	400
33	P	28°44.5′	88°39.5′	1024
34	P	28°39′	88°36′	1262
35	P	28°34′	88°33′	1481
36	P	28°27.5′	88°24.5′	1719

Station	*Sampler*	*N. Latitude*	*W. Longitude*	*Depth in Meters*
37	P	28°10.5′	88°00′	2388
38	P	28°17′	87°03.5′	1573
39	P	28°22′	87°02′	1144
40	P	28°26.5′	87°00′	960
41	P	28°31′	86°58′	860
42	P	28°35′	86°57′	823
43	P	28°44′	86°53.5′	677
44	P	28°54′	86°57′	650
45	P	29°03′	86°55′	631
46	P	29°13.5′	86°52′	555
47	P	29°24′	86°49′	446
48	P	29°34′	86°45′	223
49	P	29°38.5′	86°44′	183
50	P	29°40.5′	86°43′	165
51	P	29°42.5′	86°42.5′	155
52	P	29°44.5′	86°42′	146
53	P	29°46.5′	86°41′	139
54	P	29°48.5′	86°40.5′	128
55	P	29°50.5′	86°40′	119
56	P	29°52′	86°39′	113
57	P	29°54′	86°38.5′	106
58	P	29°56′	86°38′	—
59	P	29°58′	86°37′	91
62	O	30°00′	86°34.5′	64
63	O	30°02′	86°33.5′	55
64	O	30°04′	86°33′	49
65	O	30°06′	86°32′	43
66	O	30°08′	36°31.5′	39
67	O	30°10′	86°31′	24
68	O	30°12′	86°30.5′	27
69	O	30°14′	86°30.5′	29
70	O	30°16′	86°30.5′	24
71	O	30°18′	86°30′	24
72	O	30°20′	86°30′	22
73	O	30°22.5′	86°30′	20
74	P	29°16.5′	88°01′	204
75	P	29°19′	88°01′	146
76	P	29°21.5′	88°01′	99
77	O	29°24′	88°01′	75
78	P	29°26′	88°01′	71
80	O	29°31′	88°01.5′	42

Station	*Sampler*	*N. Latitude*	*W. Longitude*	*Depth in Meters*
81	O	29°38.5′	88°01.5′	44
82	O	29°35.5′	88°01.5′	36
84	O	29°40′	88°02′	36
85	U	29°42.5′	88°02′	36
86	U	29°45′	88°02′	36
87	U	29°47.5′	88°02′	40
88	U	29°50′	88°02′	40
89	U	29°52′	88°02′	36
90	U	29°53.5′	88°02′	35
91	U	29°55.5′	88°02.5′	31
92	O	29°57.5′	88°02.5′	33
93	O	29°59′	88°02.5′	36
95	U	30°01.5′	88°02.5′	36?
96	U	30°03′	88°03′	21
97	U	30°05′	88°03′	20
99	P	29°18′	87°50′	238
100	P	29°14′	87°54.5′	530
101	P	29°09.5′	87°51′	914
102	P	29°05′	87°48′	1097
103	P	28°50′	87°40.5′	1822
104	P	28°42′	87°33′	2213
105	P	28°32′	87°25′	1417
106	P	28°07′	87°05′	2697
107	P	27°29′	86°38′	3017
108	P	26°38′	86°16′	3072
110	P	25°27′	85°32′	3218
111	P	24°50′	85°23′	3251
112	P	25°13′	84°46′	3283
113	P	25°19′	84°40′	2280
116	U	25°43′	84°13′	155
117	U	25°48′	84°06′	139
118	U	25°48′	84°11′	146
120	P	25°30′	84°59′	3246
121	P	25°34′	84°52′	2560
122	P	25°38′	84°49′	1829
123	P	25°39′	84°47′	1326
124	P	25°42′	84°42′	914
126	P	26°03.5′	84°50.5′	1317
127	P	26°21′	85°01.5′	2150
128	P	26°23.5′	84°58′	1737
129	P	26°41′	85°14′	3180

Station	*Sampler*	*N. Latitude*	*W. Longitude*	*Depth in Meters*
130	P	26°45.5′	85°00′	3200
131	P	26°46′	84°58′	1920
133	P	26°46′	85°02.5′	—
134	P	26°49′	84°55′	950
136	P	26°57′	85°02.5′	1051
137	P	27°06′	85°22′	3160
138	S	27°29′	84°41′	183
140	P	27°18′	84°50′	256
141	P	27°17.5′	84°54.5′	320
142	P	27°17′	84°59′	421
144	P	27°17′	85°15′	914
145	P	27°16.5′	85°29′	2268
146	P	27°31′	85°40′	3164
148	P	27°47.5′	85°45′	1730
149	P	27°51′	85°44′	914
150	P	27°56′	85°32′	585
151	P	28°01.5′	85°22′	366
152	P	28°09′	85°07′	183
153	P	28°11.5′	85°02′	146
154	P	28°14′	84°57′	117
155	S	28°16.5′	84°52′	79
156	S	28°19′	84°46.5′	58
157	S	28°22′	84°41′	62
158	S	28°24.5′	84°36′	60
159	S	28°27′	84°31′	51
160	S	28°30′	84°25.5′	46
161	S	28°32′	84°20′	35
163	S	28°38′	84°08′	36
164	S	28°41′	84°02′	31
165	S	28°43.5′	83°56′	31
166	S	28°46′	83°50′	29
167	S	28°49′	83°44′	26
168	S	28°51.5′	83°39.5′	22
169	S	28°54′	83°34.5′	20
170	S	28°55′	83°28.5′	20
171	S	28°56.5′	83°22′	15
172	S	28°58′	83°16.5′	12?
174	S	29°28′	85°29′	22
175	S	29°24′	85°32′	31
176	S	29°20′	85°35.5′	46
177	S	29°16′	85°39′	49
178	S	29°12′	85°42′	86

Station	*Sampler*	*N. Latitude*	*W. Longitude*	*Depth in Meters*
179	P	29°08.5′	85°45′	146
180	S	29°04′	85°49′	183
181	P	28°59′	85°52′	186
182	P	28°54.5′	85°56′	237
183	P	28°49′	85°59′	274
184	P	28°45′	86°02.5′	274
185	P	28°38′	86°07′	320
186	P	28°31.5′	86°10′	347
187	P	28°24.5′	86°13′	457
188	P	28°18.5′	86°15.5′	585
189	P	28°13′	86°18′	732
190	P	28°06.5′	86°21′	878
191	P	27°48′	86°30′	2999
196	P	29°26.5′	86°59′	713
197	P	29°26.5′	86°57.5′	549
198	P	29°26.5′	86°57′	549
199	P	29°27′	86°58′	735
200	P	29°27.5′	86°58′	600
201	P	28°37′	89°49′	430
202	P	28°40.5′	89°45′	128
203	P	28°40′	89°45.5′	201
204	P	28°42.5′	89°42′	91
205	P	28°44′	89°40′	82
206	P	28°45.5′	89°38.5′	79
207	P	28°46.5′	89°36.5′	82
208	P	28°48′	89°34.5′	73
209	P	28°49′	89°33′	86?
210	P	28°50.5′	89°31′	86?
211	P	28°51.5′	89°29.5′	51
212	P	29°11′	88°52′	62
213	P	29°16′	88°48′	55
214	P	29°21′	88°44′	49
215	P	29°25.5′	88°40′	47
216	P	29°30′	88°36′	42
217	P	29°35.5′	88°32′	40
218	P	29°40′	88°28.5′	42
219	P	29°45′	88°24.5′	38
220	P	29°49′	88°21′	37
221	P	29°53′	88°17.5′	35
222	P	29°57.5′	88°14.5′	33
223	P	30°01.5′	88°11′	33
224	P	30°05.5′	88°07.5′	20
225	P	30°08′	88°05.5′	20

TRAVERSE	I											II																				
STATION	211	210	209	208	207	206	205	204	202	203	201	16	17	18	19	20	21	22	23	15	24	14	13	12	11	10	9	8	7	6	5	4	3
DEPTH IN METERS	51	286	286	73	82	79	82	91	128	201	430	33	58	88	106	113	142	168	208	298	314	471	631	732	914	1298	1372	1417	1875	2468	2788	2972	3017
TOTAL PLANKTONIC POPULATION	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	21	0	300	17	2	7	75	0	2 000	5 000	7 000	100 000	50 000	10 000	30 000	60 000
TOTAL BENTHONIC POPULATION	44	1200	225	650	175	125	250	175	175	150	125	31	450	250	275	175	125	650	100	800	550	36	250	425	175	325	375	425	175	550	700	500	1200
Adercotrymo glomeratum										.7									2				.4				1	1	5		1		3 2
Alveolophragmium nitidum									.5											.5			3	.4		1	.3	.8	2				
A ringens																											.9	.3	.9				
A scitulum									2		4							.3	2	.2	.4	6			1				.5		.6	.4	
A subglobosum																				.2								2		.4		1	
A wiesneri																							1	.5	5	3	2						
A sp			.5	1	1	4	9	5	9	7	3				1	1	3											.8	2				
Ammobaculites sp A							3		2	3	8					.4	3	2	.8	3		1											
A sp B																										.6	.9	1				.8	
Ammodiscus spp						.7		.6	1	5							4				1	3	.4	.7	3	.9	.3			.4	.6		1
Ammoscalaria pseudospiralis		1	8	18	9	5	3	.5						.4			8	.3	.9													
A tenuimargo																										.3	.3	5	1	2		2	.3
Angulogerina jamaicensis									1		2																	.3					
Anomalinoides mexicana																																	
Bolivina albatrossi																		.5		9	8		3	6	3	8	.8	3	4				
B barbata		.2		7														13		1													
B lowmani														.4						.7				1		2	1	.2			2	.4	4
B ordinaria																		3		3	4		11	7									
B paula																																.4	1
B pulchella primitiva																															.4	.6	.4	2
B pusilla																											.8		1		.6	.8	
B striatula spinata				4																													
B subaenariensis mexicana																			.7									.2		.4			
B subspinescens																			1			.4	1			.5			.4	1	1	1	
B translucens																						.8	.2										
Bulimina oculeata																						14	2	4	11	13	2	7		.6			
B olazanensis																									5	1	2		.7		.4	.7	
B marginata																		33		13	1												
B spicata																		.2		1	.2		4	.7		4	1	2	2				
B striata mexicana																		3		12	2		13	5		.6		.9	.6	1	.6		.3
Buliminella cf bassendorfensis				30								3																					.7
Cancris oblonga				.3																													
Cassidulina cff crassa																												.2				.4	
C curvata																				2			.4										
C neocarinata															1					.5			.8	.2									.3
C subglabosa & variants									1											.7				.2		2	4	4	11	6	4	3	2
Cassidulinoides tenuis																														.4			.3
Chilostomella oolina																					1		2	.7		.9					.6	.4	
Cibicides corpulentus																											.3						.3
C cff floridanus																				4			4	3	.6	4	3	4					
C kullenbergi																											.3					.4	
C robertsonianus																										2	.8	.2	5	4	3	6	.7
C rugosa																										.3							
C wuellerstorfi																										.9	.8	2	3	18	3	20	13
Cyclammina spp																						3	.8	.2	.6		1	.7					
Dentalina - Nodosaria																				.7	.2									.4	.6		
Eggerella bradyi																								.5		.9	.5	.5		1		1	.3
Elphidium spp									2							.6				.7													
Epistominella decorata																										.3	3	2	18	4	20	8	21
E exigua																							7	4		4	1	.5	3	.4	2		1
E rugosa																																	.3
E vitrea														.4																			
Eponides polius																				.5						.3			3	8	4	6
E regularis																		12		2	3		2							.6			
E tumidulus																											.3		2	.4	3	6	3
E. turgidus																							4	.5		.6	6	.9	.6	4	12	4	6
Pseudoeponides umbonatus																										.3	.5		.6	3	1	.4	1
Goudkina (Pseudogaud) atlantica																				.2													
G cf minuta																			.9	.2	1	8	1	3	5	.3	.3						
Globobulimina affinis & variant																		.8		.2			.4	.2	.6	3			2	5	1		
G mississippiensis				.3														.2															
Glomospira charoides									.5	3	4									.2	.7		.4	.7	2	.6	6	1				1	
G cf gordialis											3							.9	.3	3		.5	.6		.5					.4			
Goesella mississippiensis		.6	.2	1	2	4	2	2	3	1	4	3	0			3	9	2	8	6	5	3	1	.5							.6		

Table 4. Percentage distribution of benthonic Foraminifera in traverses I and II (pt.).

TRAVERSE	I											II																					
STATION	211	210	209	208	207	206	205	204	202	203	201	16	17	18	19	20	21	22	23	15	24	14	13	12	11	10	9	8	7	6	5	4	3
DEPTH IN METERS	51	?86	?86	73	82	79	82	91	128	201	430	33	58	88	106	113	142	168	208	298	314	471	631	732	914	1298	1372	1417	1875	2468	2788	2972	3017
Gyroidina orbicularis																				.2				.7		2	2	4	5	3	1		
Gyroidinoides soldanii altiformis																										.3							
Haplophragmoides bradyi						.7				2								.3	4	.2	3		.4	3	7	1	.5	.9	3	3		2	2
Hoglundina elegans																													6	4	.6	2	3
Hormosina sp											11									.7	1		2	2	4	.6	3	4					
Karreriella bradyi																										.9							
Lagena spp & related forms																		.2		1			.4	1			3	.5	2	6	9	2	5
Laticarinina pauperata																										.9	1	.9	1	3	.6		.3
Lenticulina peregrina																										.3		.2	.6				.3
Liebusella spp																																.8	
Loxostomum abruptum																												.2					
Marginulina marginulinoides																				.7													
Miliolidae																										.3	.3			.4	.6	.4	.3
Nonion pompilioides																														2	.6	2	1
Nonionella atlantica																							.4						.6				.7
N. opima	9				1															.2	2												
Nouria sp.	59	16	16	6	10	4	7	2	.5			81	18	30	3						.2												
Nummoloculina irregularis																										.3							
Osangularia cultur																							.4	5	.6	2	.8	3	2			.4	
Planulina exarna																			.9														
P foveolata																				.2													
Plectina apicularis																									.6	.3	1	2	.6	.7		3	1
Proteonina atlantica																				.2									1	1	2		
P difflugiformis			.9	7	18	25	20	24	9	13	5			2	2	6	3	3	8	1	3	3	.8	2	3	.6	6	3			.6	3	
Pullenia bulloides																				.7	.2		.4			2	1	.7	1	2	1	.8	.3
P quinqueloba																									.6	2			.6	.4	.6	.8	.3
P sp																												.2	.6	3	2	.8	
Pyrgo murrhina																											.5						.3
P cf nasutus																										.3							
Quinqueloculina lamarckiana																			.9										.6				
Q sp																										.6	.3				.6		.7
Reophax bilocularis																										.3	2	.2				.4	
R distans delicatulus																												4	.6	1	.6	6	1
R guttifera																		.2	.9	1	1	3		2	2								
R hispidulus			.9		3			2	3	1				.4		.6	2	.3	2		.7		.8	2		.6		.2		.4			.3
R scorpiurus				1	3	2	5	4	3								2	.3	10	1	3											.4	
R. sp																			9		.7	3		1									
Robulus spp.																		.9		3						.3		.7	.6				
Rosalina cf concinna																		.2									.3						
R parkerae																																	1
"Rotalia" beccarii variants		3					.4					16	2																				
"R" translucens																				.2						.3	.3		.6			.8	.3
Rotamorphina laevigata																							.4	.2							.6		
Saccamminidae & related forms									2	.7	.9						7	5	2	.7	.9	3	.8	3	18	3	2						
Sigmoilina schlumbergeri																										.9	.3	.9		.4			1
Siphonina pulchra																																	.3
Siphotextularia rolshauseni																											.5	.2				1	1
Sphaeroidina bulloides																		3		8	9		8	8	1		.8	.5	.6				
S. compacta																										.3							
Stetsonia minuta																										.3	4					.4	
Textularia earlandi	30	77	48	5			.4			15	35		79	61			.9				.9	11	2	9	3								
Talypammina schaudinni																			.9						4	.6	1	1	.6			.4	
Triloculina tricarinata																													.6		1	.4	.7
Trochammina advena									1	2	5							.3			4												
T. globulosa																									1	.9	2	2	1	2		.4	.7
T cf. japonica											7								4	1	8	13	3	5	9	1	2	1					
T. quadriloba				1	11	12	12	22	9	20	12				1	2	4	8	17	.5	5		.4		6								
T squamata & related spp.	2																																
T cf tasmanica			3			3	2		2	5							3	3	5	2	18			.2	2	1	.5	.9					
Uvigerina auberiana																																.4	
U peregrina																		.6		16	5		6	12	1	6	6	15	5	4		1	
Valvulineria mexicana																		.8		4	5		2	.2				.7		2	2	.4	.7
V minuta																				.2							.3	.2					
Virgulina advena																															.6	.4	
V complanata																											.8			.4	.6	.4	1
V mexicana																							.4								.6		.7
V pontoni				2														.5			1												
V tessellata													.2										1	2		3							
Wiesnerella auriculata											.9																						
Miscellaneous spp		3	9	3				1	9	2	9		.8	2	.6	.8	7	5	8	3	4	32	2	4	11	4	5	9	5	5	9	4	6

Table 5. Percentage distribution of benthonic Foraminifera in traverses I and II (pt.).

TRAVERSE	III													IV												
STATION	25	26	27	28	29	30	31	32	33	34	35	36	37	225	224	222	221	220	219	218	217	216	215	214	213	212
DEPTH IN METERS	22	53	77	106	155	205	373	400	1024	1262	1481	1719	2388	20	20	33	35	37	38	42	40	42	47	49	55	62
TOTAL PLANKTONIC POPULATION	0	1	29	1	21	10	69	300	425	1400	700	1400	7800	4	175	550	800	850	725	1000	0	250	200	100	0	5
TOTAL BENTHONIC POPULATION	125	650	1200	700	1300	900	750	700	700	450	300	325	325	1200	10800	30700	27500	9700	19100	27200	150	14900	9900	4300	92	350
Adercotryma glameratum								.1		.2	.7	2														
Alveolophragmium nitidum						.1				2	1															
A. ringens												.6														
A. scitulum						.1	.4	.1					.6													
A. subglobosum							.3					.6														
A. wiesneri					.3			.4	2	3	6	.9														
A. sp.										.9	2	2													1	.3
Ammobaculites sp. A						.9	.4																			
A. sp. B												.3														
Ammadiscus spp.						.1		.3	.9	.2	1	1	.3													
Ammascalaria pseudospiralis				.3		.2								2	1	.2	1	.4	.7	.8	30	.3	4	2	22	.9
Amphistegina spp.																.1		.1	.2			.2				
Angulogerina bella				.1											.1	.4	.9	1	2	2		2	6	4		
A. jamaicensis															.3				.2					.2		
Anomalinoides mexicana											.3															
Asterigerina carinata														2	1	2	2	.7	.5	.6		.4	.7			
Bigenerina irregularis														5	2	2	3	3	5	3		2	4	2		
Bolivina albatrossi						.2	.8	10	5	8	2	1														
B. barbata			.2	15	26	14			.6																	
B. lowmani				.3			3	.6	1	.9	3	2	2	.3	.3		.7	.4	.3	.5		.4		1		1
B. minima																									1	
B. ordinaria						19	16	6	.6	.5	.3	.9														
B. pulchella primitiva															.8	.8	.9	.5	.7	1		.6	1	1		
B. pusilla												.6	.6													
B. striatula spinata		.3	5	3		2											.2		.2	.2		.3	1	2		
B. subaenariensis mexicana				21	32	1	1				.3													.2		
B. subspinescens							.3	.4			.3	2	1									.1	.3			
B. translucens							2			.5																
Buccella hannai														2	1	1	1	.7	1	.5		.7	.3	.8		
Bulimina aculeata				.3			.8	10	16	10	16	7	.3													
B. alazanensis								6	3	4	.7	.3														
B. marginata				.3	14	13	.5								.1					.8		1	1	1		
B. spicata						.1	.5	3	3	.2	2	1														
B. striata mexicana							4	8				.9														
Buliminella cf. bassendorfensis	6	27	35	7	.6		.3					1			.6	.2	.2	.1	.5	1	.6	4	5	5		
Cancris oblonga																.2	.2	.5	.5	.8		.3	1	.8		
Cassidulina carinata							13	17	.3	.5																
C. aff. crassa					.3																					
C. subglobosa & variants								.6		2	.3		.6	.1	.2	.6	2	.9	2	3	.6	2	1	2		
Chilostamella oolina								1	1	2		1														
Cibicides carpulentus										.2		.3														
C. deprimus														1	5	6	5	4	2	2		2	.2	1		
C. aff. floridanus							1	1		1	.7	.9														
C. kullenbergi													.3													
C. protuberans														.1				.1		.1						
C. robertsonianus										.5	.3	.9	6													
C. wuellerstorfi										.5	.7	2	.9													
Cibicidina strattoni					.2									20	9	15	15	17	16	16	2	9	12	5		
Cyclammina spp.							.1	.4		.2		.9														
Dentalina - Nodosaria							.2											.1			.6	.1		.2		
"Discorbis" bulbosa															.1	.9	.6	1	1	2		1	.2			

Table 6. Percentage distribution of benthonic Foraminifera in traverses III and IV (pt.).

TRAVERSE	III														IV														
STATION	25	26	27	28	29	30	31	32	33	34	35	36	37		225	224	222	221	220	219	218	217	216	215	214	213	212		
DEPTH IN METERS	22	53	77	106	155	205	373	400	1024	1262	1481	1719	2388		20	20	33	35	37	38	42	40	42	47	49	55	62		
Eggerella brady									.3	.5	.3	1	2																
Elphidium advenum															.3	.1													
E. discoidale															2	.4	.7	2	2	5	2		2	.7	.4				
E. gunteri			.2												9	1	3	.8	1	1		1	2	4	1				
E. poeyanum															.3	.8	.3	.9	.2	.6	.6		.1	.8	.4				
E. spp.															5	4	4	3	3	3	3	1	2	2	2				
Epistominella decorata												1	14																
E. exiguo					.3			3	2	2	1	.6																	
E. rugosa										1																			
E. vitreo		34	29	17	4					1					.2	.7	.1	.4	.7	2	3		8	5	14				
Eponides antillarum															.1		.2	.6	.7	.3	.1								
E. polius												.3																	
E. regularis					.6	21	6	.6	5	.2																			
E. tumidulus											.7	.3																	
E. turgidus										1	1	5	22					.1											
Pseudoeponides umbonatus								.3				.3	.6																
Gaudryina cf. minuta							.1			.2					.3	.4	.1												
Globobulimina affinis & variant							.5	.6	3	6	3	.6	2																
G. mississippiensis				2	3	3																							
Globulina caribaea															.2	.1		.1		.2									
Glomospira charoides						.2			3	.7	8	4	1																
G cf. gordialis						.2		.1					.3																
Goësella mississippiensis			2	9	1	6																			.2	22	12		
Guttulina australis															2	1	.1	.3	.1	.2	.1	.6	.2	.7					
Gyroidina neosoldanii												.3																	
G. orbicularis								.6	3	.9	2	5	2																
Gyroidinoides soldanii altiformis								.1																					
Hoplophragmoides bradyi						.2		.6	.3		4	1	5																
Hormosina sp.						.1	.1	1	1	5	3	1																	
Karreriella bradyi										.2	.3																		
Lagena spp. & related forms			.2	.1	.2	.1	1	.1	2	.9	.7	1	2			.1		.1			.5		.2	.5	.6				
Laticarinina pauperata											.7	.3	.9																
Lenticulina peregrina						.4	.4	.1		.2	.3																		
Loxostomum abruptum										.2	.3																		
Miliolidae										.2					6	2	1	4	4	.7	.8		2						
Nodobaculariella cassis															.2	.3	.8	.2					.2						
Nonion pompilioides													.3																
Nonionella atlantica					.7	.2	.5								2	3	10	5	6	7	7	.6	6	10	9				
N. opima	2	31	19	7	5	1	1		.6	2			1		2	9	1	1	2	5	7	2	11	15	20				
Nouria polymorphinoides															.3	.3				.2		9							
N. sp.	11	2	4	3																						22	5		
Nummoloculina irregularis											.3																		
Osangularia cultur									2	4	4	2	3	.6															
Peneroplidae								.1							1		.7	.2	.7	.2									
Planorbulina mediterranensis																				.2									
Planulina exorna															1	.1	4	4	7	6	3		2	1	1				
Plectina apicularis											.3	2	4																
Proteonina atlantica																.3	1	1	.7	1	1	48	.8	3	1	20	.3		
P. difflugiformis			.2	.1		.8	3	2	2	4	5	9	.3																
Pullenia bulloides							.7	.6	.9	.5	.3		.9																
P. quinqueloba								.1	1	.9	.7	.9	.6																
P. sp.													.3																
Pyrgo murrhina																.3													
P. cf. nasutus																	.1	.4			.5		.8		.2				
Quinqueloculina bicostata															.1	.2	.1	.1		.2	.1		.1		.2				
Q. compta															2	.4	1	1	2	2	.5		1		.6				
Q horrida																		.4		.3	.6			.2	.2				

Table 7. Percentage distribution of benthonic Foraminifera in traverses III and IV (pt.).

TRAVERSE	III														IV												
STATION	25	26	27	28	29	30	31	32	33	34	35	36	37		225	224	222	221	220	219	218	217	216	215	214	213	212
DEPTH IN METERS	22	53	77	106	155	205	373	400	1024	1262	1481	1719	2388		20	20	33	35	37	38	42	40	42	47	49	55	62
Quinqueloculina lamarckiana															1	.4	1	1	1	3	1		1		.4		
Q. cf. polygona																							.1				
Q. sabulosa															.3	.2	.5	.1	.5	.3							
Q. sp.										.2																	
Rectobolivina advena																	.2	.4	.5	.3	.8		.7	1	1		
Reophax bilocularis											.3																
R. distans delicatulus												5	12														
R. guttifera										.2																	
R. hispidulus				.4	.3	.1		1	.3	2	1	.9	2														
R. scarpiurus						.8	.4	.1										.1									
R. sp.						.4			.3																		
Reussella atlantica																.7	1	.8	4	2	1		1	2	2		
Robulus spp.			.2	.8	.2	.1	.3	.3			.3						.1	.1	.5	1	.7	1	.8	.7	.6		
Rosalina berthelotti																		.2	.1								
R. cf. concinna					.2										11	21	24	23	18	11	16	.6	18	1	.2		
R. floridana															6	5	4	3	2	2	2		1	2	1		
R. parkerae																		.2		.2	.4			.2	.4		
R. suezensis													.3				.4	1	1	2	2		1	.3			
"Rotalia" beccarii variants	.2	.6	.3												14	20	4	3	3	2	2	.6	3	5	3		
"R." translucens								3	3		.7	.7	.6														.9
Rotamorphina laevigata									.1		.7	.3		.3													
Saccamminidae & related forms						.2	.3	.1				1	1														
Seabrookia earlandi																		.1									
Sigmoilina distorta																		.2		.5	1		.4	.7			
S. schlumbergeri											.3	.3															
S. tenuis														.3													
Siphonina pulchra																				.2				.2			
Siphotextularia curta										.2	.3	.3															
Sphaeroidina bulloides						.3	1	3	4	.5																	
Spirillina vivipara											.3																
Spiroloculina cf. grata																.8	.8	.5	.4								
Stetsonia minuta										.2	.3					.3	.5	.8	.7	.8	2			1	2		
Textularia candeiana																	.1	.1									
T. earlandi	21	5	.3	3	.6	5	.8	2	2																	12	79
T. mayori																.2	.9	2	2	1	1		.6				
Tolypammina schaudinni											.3	.9	.3														
Triloculina cf. brevidentata															.1	1	.7	.4	.4		.4		.2		.4		
T. tricarinata								.1		.7																	
Trochammina advena						.4	.1																				
T. globulosa									.6	1	5	4	3														
T. cf. japonica							.8	1	1	.5	.7	3															
T. quadriloba						.8	.4		.9		.3																
T. squamata & related spp.				.4											.2	.2			.1		.1						
T. cf. tasmanica						.1	.1				2	1	.3														
Uvigerina laevis																	.1										
U. parvula			2	9	7													.2		.5	.9		1	1	3		
U. peregrina						2	12	7	16	7	5	.3	1		.1												
Valvulineria mexicana							11	.7																			
V. minuta																							.1				
Virgulina advena													1														
V. complanata								.1				.9	.6			.2		.2	.2	.5	.1		.2	.2			
V. mexicana							.5	3																			
V. pontani		.2	1	1	.3	.1											.1	.2	.1	.3	.9		2	2	4		
V. punctata			.2													.8	1	2	2	.5	1		.2		.4		
V. tessellata								.1	.6	13	15	5	.9														
Wiesnerella auriculata													.9			.1								.2			
Miscellaneous spp.	59		1		3	6	11	1	4	2	6	12	6		2	3	3	2	3	4	3	2	2	1	2		.6

Table 8. Percentage distribution of benthonic Foraminifera in traverses III and IV (pt.).

TRAVERSE	V																																
STATION	97	96	95	93	92	91	90	89	88	87	86	85	84	81	82	80	78	77	76	75	74	99	100	101	102	103	104	105	197	198	200	196	199
DEPTH IN METERS	20	21	?36	36	33	31	35	36	40	40	36	36	36	44	36	42	71	75	99	146	204	238	530	914	1 097	1 822	2 213	1 417	549	549	600	713	735
TOTAL PLANKTONIC POPULATION	64	24	10	600	475	80	24	96	400	275	44	52	150	4	650	125	5 000	1 600	5 800	950	650	900	1 400	2 600	900	3 600	1 900	22 400	4 600	4 800	34 900	17 500	35 300
TOTAL BENTHONIC POPULATION	5 600	4 900	2 100	15 100	22 400	7 300	2 300	3 000	8 000	7 400	1 900	2 200	4 000	1 100	7 000	1 400	22 000	4 400	12 800	5 000	3 100	3 200	2 900	1 300	550	650	650	1 900	1 100	2 500	3 200	4 100	5 800
Adercotryma glomeratum																									1	1	.3		.5	.5		.2	
Alveolophragmium nitidum																							.1		.7	1	.3			.3			
A. ringens																										.3		.4					
A scitulum																											.3						
A subglobosum																							.1		.7			.4		.3			
A wiesneri																									.7	6		.4	.2	.2			
A. sp.																									1	.6							
Ammobaculites sp. A																			.2	.2													
A sp. B																										.3	1						
Ammodiscus spp.																									2	.3	.3		.7				
Ammascalaria pseudospiralis	.3	.3	.3	.3		.4		.1			.6	.5	1																				
A tenuimarga																										.3							
Amphistegina spp.				.1		.8	3	2	.8	.6	3	1	.8				.3	5				.1											
Angulogerina bella		.2	.3	.1	.6	.2		.1	.8	.2	.2	.7	.2		.5		.9	.4	.8	.8	.5	.4											
A. jamaicensis								.1		.4	.2	.2			.5		1	1	2	4	.8	2	.3	.6	.4								
Anomalinoides mexicana																							.3	1		.6	.3	.4	.5	.3	.2		.7
Asterigerina carinata	2	5	4	2	2	2	3	1	1	2	.6	1	3	2	.7	.6	2	2	.8														
Astrononion tumidum																												.4	.4				
Bigenerina irregularis	1	1		1	2	3	1	2	5	2	2	3	3	4	4	3	5	1	2														
B. textularioidea							.7		.2		.9	1	1	2	.9	5	.3	1	.5														
Bolivina albatrossi																				.2	1	3	2	7	3	.3		4	3	3	6	9	9
B. barbata																				2	1	.4	.1										
B. fragilis										.2							.3		1	7	3	2	.3										
B lanceolata																			.5	.8	2	1	.4	.3									.3
B. lowmani				.2	.1	.4	.3		.2	.4	.2	.2					1		.2	4	3	3	7	2	3	3	4		1	3	2		1
B. minima																				.5	6	4	8	.9						.2	1	.6	2
B. ordinaria																							2	4	1	.3			7	9	8	1	6
B paula																							.1	.3									
B pulchella primitiva	.8	.5		.2	.1	.4		.1		.2	.2	.2							.2	.3	.6	.8	.1	.3									
B. pusilla																	.3			.3						2	2						
B. striatula spinata															.2			.7	1	.6	.5	.1		.3									
B subaenariensis mexicana																			1	4	8	10	1	.6							.8		.6
B subspinescens						.2										.3	.6	1	.5	2	3	4	3	.9		.9	.9		3	2	1		.4
B translucens																				.2	.3	.1	.7	.3	.7								
B sp																														.5			.8
Buccella hannai	1	2	2	.4	1	1		1	.4	3		.4	1		1		.6		.5	.2													
Bulimina aculeata																							3	10	8	2	3	10	4	1	6	3	4
B alazanensis																							1	9	4	.9		4	7	5	1	12	9
B marginata																		.4	.8	3	2	1	.6										.4
B spicata																	.3			1	1	1	.8	2	2	2	1	1	.2	.2		.4	.4
B striata mexicana																					.9	.5	2	2	.4		1	.8	2	2	3	5	5
Buliminella cf bassendorfensis				.1		.2					.2																						
Cancris oblonga	.3			.6	.1	.2			.6	.2	1	.4	.2		1	.9	1	2	2	1	.6	.1											
Cassidulina carinata																								1	.4			.4	.9	2	.5	.2	7
C. aff crassa																						.3		.6						.3	.2	.2	.3
C curvata												.2					.6	.4	.8	1	2	3	.4						.2	.2	.8	1	
C. laevigata																	1	.7	2			.1											
C. neocarinata																			.5	3	2	3	4	1				.4	2	1	5	6	1
C. subglobosa & variants				.2	1	.2		1	.4	2	6	1	.2	.4	2	.6	4	3	8	17	23	16	11	2	.7	.9	4	8	9	8	4	3	2
Cassidulinoides tenuis																													.5	.3	.2		.1
Chilostomella oolina																				.6	1	.8	1	2	.7		.3		2	1	1	.2	.6
Cibicides corpulentus																			.2	.2					.4				.2	.3	.5		
C. deprimus	12	6	9	5	5	3	.7	2	.8	.9	.2	.2	.8	.4	.7		1	2	2	.5	.4	.6		.3									
C. aff floridanus																	2	4	6	5	2	.6	.6	3	1	.6		.4	3	4	5	4	1
C io																	.3	1	1	.2													
C. kullenbergi																										.3							
C. mollis																	.9		1	.3													
C. protuberans								.4	.2		.2	.4	.4	.4	.2	1	5	10	2														
C. robertsonianus																								.3	.4	2	1	3		.2			
C. rugosa																								.6	.4				.2				

Table 9. Percentage distribution of benthonic Foraminifera in traverse V (pt.).

TRAVERSE	V																																
STATION	97	96	95	93	92	91	90	89	88	87	86	85	84	81	82	80	78	77	76	75	74	99	100	101	102	103	104	105	197	198	200	196	199
DEPTH IN METERS	20	21	?36	36	33	31	35	36	40	40	36	36	36	44	36	42	71	75	99	146	204	238	530	914	1097	1822	2213	1417	549	549	600	713	735
Cibicides umbonatus														.4								.4									.2		
C wuellerstorfi																								.6	1	.9	.9	1	.4				
Cibicidina strattoni	17	24	19	20	19	25	26	28	27	27	22	30	35	33	30		14	9	7	1	.5	.1											
Cyclammina spp																									.4			.8	.2	.2	.2		
Dentalina - Nodosaria																			.2	.8								.4	.2	.3	.9	.4	.6
"Discorbis" bulbosa			.3	.1	.6	.7	1	.7	1	2	2	.2	.4	.4	.5	.6	.6		1	.4		.3											
Eggerella bradyi																							.1	.3	.4	1		.4	.2				
Elphidium advenum		.3	2		.1	.2	.3	.3							.4	.3			.2														
E discoidale	.6	2	3	2	1	1	3	2	.8	2	2	2	2	2	2	.6	3	.7	2														
E gunteri	2	9	5	1		.7	.3							.4	.5																		
E poeyanum	2	.7	.8	1	.7	1	1	.3	.6		.2	.4	1	.4	.7	.6	.6			.3													
E. spp	4	3	4	2	3	3		2	2	3	3	.7	1	.7		.6	.3	.4		.2	.3	.6	.3	.3									
Epistominella decorata																										4	9	17					
E exigua																						.1	2	2	2	2	3	2	9	9	[illegible]	1	3
E rugosa																							1	.3			.3	2	.9	1	1	4	.8
E vitrea		.2			.1			.1			1	.2			.2		.9	.7	.5	.6	.4	.6	.4	.6		.3					.2		
Eponides antillarum				.1	.4	2	4	4	3	.6	2	4	6	9	4	8	1	6	2	.2													
E. palius																										.3	.9	3		.2			
E regularis																				1	4	2	2	.6		.3							
E repandus							.7	.1				.2			.2	.3		.4															
E tumidulus																										.3		.4					
E turgidus																		.4		.2	.9	.4	2	1		6	19	8	3	3	.5	[illegible]	2
Pseudoeponides umbonatus															2		.3		.2	.2	.1		.4	.3		1	2		.5	.2	.2	.4	.7
Gaudryina cf aequa													.2			.3	.3	.7	.5														
G cf minuta		.2	.3		.1		.7	.1		.2	.4	.2														.6				.5			
Globobulimina affinis & var																							1	.6	8	.6	1				.5	1	1
Globulina caribaea				.1		.2			.2			.2	.2																				
Glomospira charoides																								.3	.7	6	9	.8		.2		.2	
G cf gordialis																											.9						
Gaesella mississippiensis																			.5														
Guttulina australis	.6	1		.7	.3	.7	.3	.5	.6	.4	.2		.4	1															.2				
Gyroidina neosoldanii																													.2		.8		
G orbicularis																						.1			3	2	4	4	.7	.5	.5	1	.3
Gyroidinoides soldanii altiformis																				.3	.5	.3	.1	.6		.3				.2		.6	.6
Haplophragmoides bradyi																					.1			.6	3	2	4	2	.4	2			
Höglundina elegans																			1	.2			.3						.4	.5	2	.4	.1
Hormosina sp.																						.1		.3	3	.3			.5	.5			
Karreriella bradyi																								.3	.4						.2		
Lagena spp & related forms				.3			.7		.6	.9	.6	.5			.5			.7	.2	1	1	.9	1	1	1	2	1	1	2	1	1	.8	2
Laticarinina pauperata																								.3		2		2	.2				.3
Lenticulina peregrina																				.2			.4	.3	.4	.3			.5	.2	1	.4	
Liebusella spp.																		.7															
Loxostomum abruptum																							.1	2				.4	.9		.5		
Marginulina marginulinoides																			.5														
Miliolidae	11	5	5	5	4	4	6	3	3	4	6	5	3	3	3	6	1	4	5	1	.3	.1				.6	.3					.2	
Nodobaculariella cassis	.6	.8	.5	.4	.4	.4		.5	1	.4	.4	.2	.6				.9	2	1			.1											
Nodosaria hispida																				.2										.3	.2	.2	
Nonion formosum																		1	1	.2	.1	.1										.2	
Nonionella atlantica	5	2	4	1	6	3	3	4	4	5	5	1	2	.7	3	1	3	1	1	2	.2	1	.2							.2			
N opima	.3	.3		1	.8	.2			.6	.4	.6	.2			.7	.3	.6	.4	1	1	1	1	.7			.3							
Nouria polymorphinoides							.3					.2	.2			.6																	
Osangularia cultur																								5	4	9	5	3	.5	.2	.8	1	.6
Peneroplidae	1	2	4	1	2	4	4	3	4	3	1	6	5	11	3	3	2	1	1														
Planarbulina mediterranensis				.1	.1			.1	.6		.4	.2	.4		2	1		1	.4														
Planulina ariminensis																							.7						.4	.6	1	1	.6
P exarna	2	3	4	4	7	9	12	[illegible]	13	12	4	11	13	13	11	43	9	7	6	2	.8	.5											
P foveolata																					.5	.9	.3										
Plectina apicularis																										2	2	.8	.2		.5		
Proteonina atlantica											.2	.2	.8		.7		.6	.4	.2	.2	.3	.3	.3		.4								
P difflugiformis																							.1		3	6	2		.2	.2			
Pseudoclavulina mexicana																					.1												
P aff navangliae																															.5		
Pullenia bulloides																					.3	.5	.3	.3	.7	.3	2	2		.3	.5	.4	.4
P quinqueloba																			.2	.3	.5	.3	.1	1	2	.6	2	[illegible]	.6	.3	2	.2	1
Pyrgo murrhina																			.2		.6	.1					.3						
P. cf. nasutus				.5				.3			.2				.2		.6	1	1	2	.1	.9	.3										
Quinqueloculina bicostata			.3	.3	.4	2	3	2	.4	.9	2	3	.6	3	2	3		.4															
Q compta	2	1	2	.6	1	.4	1	2	2	2	2	3	3	1	2	3	.6	.4	.2														
Q harrida		.3		.2	.1	.7		.1	.2		.4							1	.5	.5	.1												

Table 10. Percentage distribution of benthonic Foraminifera in traverse V (pt.).

TRAVERSE	V																																
STATION	97	96	95	93	92	91	90	89	88	87	86	85	84	81	82	80	78	77	76	75	74	99	100	101	102	103	104	105	197	198	200	196	199
DEPTH IN METERS	20	21	?36	36	33	31	35	36	40	40	36	36	36	44	36	42	71	75	99	146	204	238	530	914	1097	1822	2213	1417	549	549	600	713	735
Quinqueloculina lamarckiana	.8	.8	1	.7	1	2	3	2	1	1	2	3	2	3	2	3	3	3	.5	.2													
Q cf polygona		.5		.5	.3	.2		.4	.2	.2		.2		.4	.7	.3	.6		.2														
Q sabulosa	.8	.3		.6	.3	.4	1		.8		.2	.5		.4		.6	.6	.4															
Q sp																	.3								.4			.4					
Rectobolivina advena					.1	.4		.1	.2	.4			.2		.2		.6		.8	.2													
R dimorpha																														.2	.5	.2	
Reophax bilocularis																											.3			.2		.2	
R distans delicatulus																										1	.3	.4		.5			
R guttifera																									.7				.2	.2			
R hispidulus																				.2	.4	.9					.9	.4	.2	.5			
R irregularis																.3																	
Reussella atlantica	.6	2	.5	2	.9	3	2	4	5	3	2	1	1	.4	4	2	8	1	1	2	.4	.5											
Robulus spp					.3				.2	.4			.2			.3	1	3	2	.8	1	1	.8	.3	.4		.3		.4	.3	1	.4	.1
Rosalina bertheloti																			.2	.3	.1	.1											
R cf concinna	20	12	14	19	26	12	10	6	6	8	8	3	2	.7	2	.6	2	3	4	4	3	5	.7	.6									
R floridana	5	8	5	5	3	2	1	.9	.2	1	.4	.4					.6	1		.3	.1	.3		.3									
R floridensis																		.7															
R parkerae				.3	.1				.2								.3		.2	.5	.8	.6		.3		.6		.4					
R suezensis	1		.8	.9	1	2	1	1	2	1	2	.9	1	.4	2	.6	1	2	2	1	2	.9	.3										
"Rotalia" beccarii variants	4	4	6	2	3	2	2	3	2	3	2	2	2	1	1	.4	.5																
"R" translucens																					.1	2	14	3	.4			2	15	19	8	5	7
Rotamorphina laevigata																				1	1	1	.4	.9	1	.9	.9		.5				.1
Saccamminidae & related forms																										2	.6		.2	.8			
Seabrookia earlandi																			.5	.5	.4	.5	.3	.6			.3	.4					
Sigmoilina distorta																	.3	.4	.8	1	.9	1	.6							.2			
S schlumbergeri																							.1		.4	.3					.2	.4	
S tenuis																							.3			.3				.3			
S sp																		.4															
Siphonina pulchra							.3						.2		.2		.6	.4	2	.3	.4	.3	.1							.2	.8		.1
Siphotextularia curta																										.3							
S rolshauseni																										.6	.3	.4					
Sphaeroidina bulloides																			.5	.3	.5	1	2	2	2	.9		.8	3	2	6	4	3
S. compacta																														.6	.2	.2	
Spiroloculina cf grata				.3	.1		.7	.1				.2					.9	.7	.8	.2													
S saldanii				.2					.4			.2	.2						.2	.3		.1											
Spiroplectammina floridana																	.3	.7															
Stetsonia minuta		.3	.3	.2	.4			.1	.2	.6	.2	.2										.3	.6	.3		.6		.4	.7	1			
Textularia candeiana			.3	.3	.3	.7		.1	.4		.4	.5		.7	.7	.3		.7	.2			.1											
T. conica								.3									.3		.2														
T. earlandi																				.2		.1		.9									
T. foliacea occidentalis																			.2														
T. mayori	.3	.5		1	.6	2	2	3	3	1	2	3	4	3	4	6	.7																
Textulariella spp																	.4																
Tolypammina schaudinni																													.2				
Trifarina bradyi																.6		.4		.2									.7	.8	.8	2	2
Triloculina cf brevidentata	1	.2	.8	2	.7			.5	1	1	3	2	.2	1	.2		1	.4		.5	.1	.1											
T tricarinata																						.1											
Trochammina advena																					.1				.4								
T globulosa																									6	4	.6	.4					
T cf japonica																					.1	.1	.4		1	.9	.3		.5	.5			
T. quadriloba																									.4								
T. squamata & related spp								.1																									
T cf. tasmanica		.3															.3									.9			.2				
Uvigerina auberiana																										.3						.2	
U. hispida-costata																													5	.2	6	13	8
U. laevis																			2	4	4	5	3	1					.2				
U. parvula								.1				.2			.2		.3	1	4	3	1	1	.3	.6									
U peregrina																					2	6	2	14	10	3	1	3		2	8	13	9
Valvulineria minuta																			.2		.9	.8	.3		.4				.4	1		.2	.7
Virgulina advena																											.6						
V complanata	.3			.2					.2												.1	.1	1				.6		.2	.3	.2	.2	.3
V. mexicana																					.1	.1	1	.3					.4	.4	.8	.2	1
V pontoni										.2												.1	.4										
V punctata	.3	.2	.5	1	1	.6		1	1	2	5	2	.2		.9	.5		.7	1	2	1		.3										
V. tessellata																							.7	2	8		.3		1	.2	.5		.6
Wiesnerella auriculata	.3			.3	.1	.2			.2		.2	.2																					
Miscellaneous spp.	.1	1	1	3	1	2	1	2	.5	1	1	1	.4	1	1	.8		4	4	4	2	1	1	2	2	6	4	4	1	.4	3	1	2

Table 11. Percentage distribution of benthonic Foraminifera in traverse V (pt.).

TRAVERSE	VI																																		
STATION	73	72	71	70	69	68	67	66	65	64	63	62	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	106
DEPTH IN METERS	20	22	24	24	29	27	24	39	43	49	55	64	91		106	113	119	128	139	146	155	165	183	223	446	555	631	650	677	823	860	960	1144	1573	2697
TOTAL PLANKTONIC POPULATION	0	10	48	4	6	0	10	49	11	64	275	350	700	6 200	5 000	8 200	7 400	5 300	12 700	11 700	18 400	10 500	19 800	6 500	26 200	12 100	11 300	11 200	5 600	11 500	14 300	19 500	53 000	20 200	13 000
TOTAL BENTHONIC POPULATION	250	1 800	6 700	850	375	400	1 100	1 100	275	1 700	4 200	3 300	4 300	29 100	24 300	28 000	12 100	18 700	23 600	27 500	9 600	9 000	13 800	2 100	7 800	3 100	2 200	1 600	1 600	2 500	2 100	3 600	5 100	1 300	600
Adercotryma glomeratum																											.1		.3	.3			.3		.6
Alveolophragmium nitidum																									.1	.1					.2	.1		.2	.3
A. ringens																														.2					
A. scitulum													.1																.1	.2		.2	.2	.5	.3
A. wiesneri																										.1					.6	.1		.2	
A. sp										.1	.2		.1																			.1	.2		
Ammobaculites sp B																														.2					.3
Ammodiscus spp							.2																		.1						.2	.1	.2		
Ammoscalaria pseudospiralis													.3																						
Amphistegina spp		.2			2	13	.2	6	28	50	48	19	15	2	.8	.9																			
Angulogerina jamaicensis							.4	.5		.1	.4	.1	.5	2	1	.7	2	1	1	.8	.3		.3					.1	.3						
Anomalinoides mexicana																								.2	.3		.1		.3	.5	.2	.2			
Asterigerina carinata	4	12	10	9	15	21	3	4	3	3	2	4	.8	.1		.5		.2	.1	.1		.4													
Astrononion tumidum																										.1									
Bigenerina irregularis		1	1	1	4	1	.9	2	4	.6	1	2	3	.8	.4	.2	.5			.2	.2														
B. textularioidea		.1		.5	2	.5	.7	2	3	2	3	3	6	.5	.3			.2																	
Bolivina albatrossi													.1							.1	.3	.2	.7	5	10	4	6	7	6	7	6	4	3	.5	
B. barbata																							.1												
B. fragilis														.2	2	2	3	.5	3	3	2	1	2	1											
B. goesii																			.1	.2		.4	.2	.4											
B. lanceolata												.6	.3	.2	.1	.2	.5	2	.5	.3	1	1	2												
B. lowmani							.5	.3				.1	.1	.3	1	2	3	4	4	4	8	4	7	4	2	2	2	1	.5	3	3	.4	.8		2
B. minima																.5	.5		.8	1	5	6	6	7	4	.8	.1	.1			.2				
B. ordinaria																.2		.2	1	2		.2		.8	4	5	8	3	.3	.8	.8	.6	.3	.3	
B. paula															.1		.3																		
B. pulchella primitiva		.7	.7		.5		.5	.1					.2	.9	.9	1	.3	1	.4	.7															
B. pusilla																																			1
B. striatula spinata															.7	.5		.7	.7	.9	.5	.2													
B. subaenariensis mexicana															.1	.7	.8	.2	.5	.7	3	11	17	16	.7										
B. subspinescens													.2	.6	2	.7	.3	.5	1	1	.7	1	.7	2	1	1	.9	.5	.3	.6	.2	.2			.3
B. translucens																				.1	.2		.2	.6	.3	.1	.3								
B. sp																												.4	.4	.6		.3	.2	.2	
Buccella hannai		.9	2	1	.5	.5	1	1		.1			.1	.7	.4		.5	.2																	
Bulimina aculeata																								.2	.7	1	3	3	1	3	2	6	7	4	.3
B. alazanensis																									.7	4	6	7	8	9	7	10	5	.5	
B. marginata													.1	.1	.3	.2	.8	2	3	3	2	3	1	.8	.2										
B. spicata													.1			.5	.3	.7	.5	.2		.2	.3	.4	.1	.3	.3	1	1	1	.6	.8	.8	3	
B. striata mexicana																								1	2	2	2	1		.2	.4	.1	.2	3	.6
Buliminella cf bassendorfensis																			.3																
Cancris oblonga						.5	.4	.2		.1			.5	.5	1	1	1	2	1	.9	.5	.9	.3	.6											
Cassidulina carinata									.4												.3	.4	.1	.6	.3	.4	.9	.1	.1	.2			.2	2	
C. aff crassa																				.2		.4	.8	.4	2	.8			.3	.2			.3	2	
C. curvata												.2	.6	2	1	3	2	.3	1	3	5	3	2	2	2	1	.3		.3						
C. laevigata								.5		.1		.1		.7	.7	.7		.2																	
C. neocarinata													.1			.2	2	1	6	7	10	4	8	4	7	4	.7	.2		.2	.6	.1			
C. subglobosa & variants	.8	.2	.2	.2			1	1		.2	.2	.9	2	9	13	13	9	15	9	5	4	4	2	1	1	9	10	14	16	15	12	15	13	6	1
Cassidulinoides tenuis																										.1	.4	.5	.4	.3	.4	.3	.6		
Chilostomella oolina																			.1	.1		.2		1	.8	1	2	2	.4	.3	.4	.1	.2		.3
Cibicides corpulentus																			.3		1	4	.5	.2			.5				.2	.4	.6		
C. deprimus		1	4	4	2		3	1		.1	.2	.1	.5	2	1	3	2	1	.5	.7							.1	.1							
C. aff floridanus								.2				.9	3	5	2	2	4	2	5	6	2	2	3	2	2	4	4	4	3	2	3	3	5	.8	
C. io												.2	.2	.5	.5	.7		.3	.3																
C. kullenbergi																																.1		.5	2
C. mollis											.2	1	.9	.8	.7	.5	2	.5	.3	.3															
C. protuberans								1	.4	.3	.6	2	1	4	3	4	5	.7	.4	.8	3	4	.7												
C. robertsonianus																									.1	.1	.3	.4	.4	.3		.4	2	.8	2
C. rugosa																											.1	.1	.5	.5	.2	.4	.8	.5	
C. umbonatus																	.3		.1	1	3	3	5	5	1										
C. wuellerstorfi																														.5	1	2	3	3	9
Cibicidina strattoni	4	10	11	5	5	3	11	6	2	.6	.8	4	4	5	3	2	.8	.7	1	1	.2														
Conorbina orbicularis								.1						.1	.4	.5	.3				.2			.2											
Cyclammina spp.																											.1	.1		.2					
Dentalina - Nodosaria													.2		.1			.2	.5					.2	.6	.1	.1	.1	.1			.1		.4	

Table 12. Percentage distribution of benthonic Foraminifera in traverse VI (pt.).

TRAVERSE	VI																																		
STATION	73	72	71	70	69	68	67	66	65	64	63	62	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	106
DEPTH IN METERS	20	22	24	24	29	27	24	39	43	49	55	64	91		106	113	119	128	139	146	155	165	183	223	446	555	631	650	677	823	860	960	1144	1573	2697
"Discorbis" bulbosa		.2	.2	.7	1		2	.5				.1	.1	1	.3	.9	.3	.7	.5	.6	.7	.2													
Eggerella bradyi																									.1	.4	.2	.2	.3	.5	.2	.3	.2	.8	5
Elphidium advenum		1	.2	.5	2	2	.4	.7	.4	.1	.2		.1																						
E. discoidale		2	2	3	.5	4	2	3	2	.6	.8	2	2	2	.8		.3		.7																
E. gunteri		.1						.1	.4																										
E. paeyanum	.8	.6	1	1	2		.5	.4		.2		.1		.5	.2		.3																		
E. spp.	8	3	3	1	.5	2	1	1						2	4	5	6	4	4	3	.8	.9	.1												
Epistominella decorata																														.3	.8	.3	.5	22	13
E. exigua																								.2	2	8	7	8	9	7	8	7	3	3	.3
E. rugosa																									.6	2	.7	2	.6	3	1	4	2		
E. vitrea														.7	.1	.2	.3		.1	.1	.3				.1	.4		.2		.5	.2				
Epanides antillarum						.5		.6	.4	.6	1	2	2	.4	.3	.2																			
E. polius																														1	1	.9	.3		4
E. regularis																				.2				.2					.9						
E. repandus		.1			.5	.5		.7	.8	5	5	.9	1									.2													
E. tumidulus																											.1			.3	.2				3
E. turgidus							.2					.1	.2	.2	.5	.7	.3	2	.5	2	.5	.4	1	1	.2	3	5	1	6	5	8	3	2	4	19
Pseudoepanides umbonatus												.1	.3			.2	.8	.2		.1		.2	.2		.3	.8	.8	.9	.1	.2	.4	.4	.2	2	2
Gaudryina cf aequa														.3	1	.7	.5			.3															
G. (Pseudogaudryina) atlantica																						.2		.2											
G. flintii																								.2									.5	.2	
G. cf minuta						.5	.7	.2																		.3	1	.4	1	.6	1	.1			
Globobulimina affinis & var																						.4	.2	.2			.4	.1	.1			.1	.2	.6	
Globulina caribaea			.7	.2	.5	1	.4	.7			.6																								
Glomospira charoides																					.2				.1	.1	.4	.2	.1	.5		.1	.6	.2	
G. cf. gordialis																																			.6
Guttulina australis		.3	.7	.7				.4		.1	.2	.2																							
Gypsina vesicularis		.1				.5		.3		1	1	.6	.8	.3																					
Gyroidina neosoldanii																													.3				.8	.2	
G. orbicularis																						.2	.1	.6	.3	.6	1	.6	.9	1	.6	1	3	4	2
Gyroidinoides soldanii altiformis																					.2		.3		.1	.4	.2	.4	.1	.5	.6	.9	.5	.3	.
Haplophragmoides bradyi																					.2					.3	1	.5	1	2	2	1	.6		2
Höglundina elegans												.2		.5	.8	.7	1	.9	.7	.9	.3	.4	.6	.4	2	.3							2	8	1
Hormosina sp																										.1	.2		.5	.5	.2	.6	.2		
Karreriella bradyi																			.1	.1	.5			.4	.5			.1	.1	.5		.2	.2	.2	.3
Lagena spp & related forms	.8						.2	.1						.8	.8	1	.8	.2	1	1	.8	.7	.5	1	2	2	2	2	1	2	2	2	1	2	5
Laticarinina pauperata																									.2	.8	1	1	.9	1	.8	.4	.9	1	.6
Lenticulina peregrina																					.2	.2	.3	.2	.5	.5	.8	.9	.7	.8	.4	.8	.2	.2	
Liebusella spp																		.2	.4	.1	.2		.6												
Loxostomum abruptum																									.1	.5	.3	.4	1	2	2	.9	.3	2	
Marginulina marginulinoides																	.3		.3		2	.7	.1		.1										
Miliolidae	7	5	6	5	6	6	6	6	10	4	3	5	4	8	10	9	4	8	7	4	.7	1	.2	.4			.1	.1							2
Nodobaculariella cassis		2	1	2	6	2	3	1	11	3	3	5	1	.5		.2			.1	.1															
Nodosaria hispida																								.4	.9										
Nonion formosum														.2	.4		.5	.2	.5	.2	1	1	.8					.2	.3			.1	.2		
N. pompilioides																																			1
Nonionella atlantica		3	4	3	1	2	1	2	.8	.1		.2	.6	2	2	2	.8	1	.5	.7	.7	.4			.3										
N. opima		.2	.2			.5		.1						.9	.5	.7	.3	.5	.1	.5		.1		.4			.1			.5	.4				
Osangularia cultur																										.1	1	3	6	5	5	3	2	.2	.9
Peneroplidae	.8	7	9	9	9	17	6	4	4	3	3	5	2	.2	.4				.1																
Planorbulina mediterranensis				.2				.4	.4	.6		.4	.3	.1																					
Planulina ariminensis																						.2	.5		1	1	.6	.2	.1	.5	.2				
P. exorna	.8	5	5	10	9		16	20	8	2	.8	3	2	2	3	.9	1	.2	.3	.1		.2													
P. foveolata																.2	.5	.3	1	2	4	5	2	1											
Plectina apicularis																										.1		.1	.5						3
Proteonina atlantica								.1				.1																							
P. difflugiformis																				.1	.2	.2		.6		.3	.1	.1	.9	.6	.2	.1			.9
Pseudoclavulina mexicana													.7										.1		.5										
P. aff. novangliae																			.7	.2	.8		.2	.8											
Pseudoglandulina comatula																					.2	.4													
Pullenia bulloides																					.2		.5	1	1	.4	.2	.6	.3	.3	.2	1	.9	.2	.6
P. quinqueloba														.2		.5			.7	.1	.5	.2	.2	.2	.1	.1	.4	.6	.6	.2	.8	1	.9	1	1
P. sp																																.1			
Pyrgo murrhina								.1									.3								.1					.2	.6	.1		.6	
P. cf. nasutus								.2					.3	.4	.8	.7	.3	.5	.5		.3	.4	.2	.4	.2										
Quinqueloculina bicostata		.1		.2		1	.2	.8	2	.6	1	.2	.4	.1																					
Q. compta		.5		.7	2	2	.7	.7	.8	.7		1	.5	.4	.1	.2	.5		.3																
Q. horrida								.4		.7	.6	1	5	1	.4	.2	.5	.2	1	.7	1	.5	.7												
Q. lamarckiana		2	.5	.2	2	4	.9	4	8	7	11	8	6	2	.9	.7	1		.2	.2	.8		.6												
Q. cf. polygona		.7	.2		.5	.5		.1		.2	.4	.7	.2	.2																					

Table 13. Percentage distribution of benthonic Foraminifera in traverse VI (pt.).

TRAVERSE	VI																																		
STATION	73	72	71	70	69	68	67	66	65	64	63	62	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	106
DEPTH IN METERS	20	22	24	24	29	27	24	39	43	49	55	64	91		106	113	119	128	139	146	155	165	183	223	446	555	631	650	677	823	860	960	1144	1573	2697
Quinqueloculina sabulosa	.8	.1	.2	1			.2					.2	.1	.1																					
Q. venusta																																			.3
Q sp.																																		.3	.6
Rectobolivina advena			.5	.2			.4	.1				.1		.8	1	.5	.3	.3	.1	.2			.1												
R dimorpha																									.1	.1	.2	.1		.2			.3		
Reophax bilocularis																									.3	.3	.1		.4	.2				.2	
R distans delicatulus																															.2				
R. hispidulus															.1										.1			.7	.1	.2	.4				
R. irregularis											.2	11	9		.1						.7	.2	.2												
R. scarpiurus																					.2				.3										.3
R. sp.																										.1									
Reussella atlantica		.9	1	1	.5	2	2	5	3	.7		.7	.4	.9	2	1	.5	.5	.8	.7	.2	.2	.1												
Robertina bradyi															.1								.2											.2	
Robulus spp							.2	.6	.4	4	4	2	5	1	1	2	.8	.9	3	2	2	4	3	3	1	.3	.7	.2	.1		.2			.2	
Rosalina bertheloti														.4	.4	.9	2	.9	2	1	2	1	.8	.2											
R. cf concinna	14	15	19	23	15	5	18	7	.4	.5		.6	2	14	12	11	15	12	8	9	.8	.4	.2	.8											
R. floridana	15	7	10	7	2	.5	4	2		.2	.2	.2	.4	3	3	2		.5	.7	.8															
R floridensis									.4	.8	1	2	.8	.5		.2				.1															
R. parkerae	.8	.3	.2					.5				.1		.2	.9	1		.7	.8	.6		.4	.1												
R. suezensis		2	.2			.5	.5	.3				.1		1	1	1	1	2	3	4	2	2	1	.4											
"Rotalia" beccarii variants	34	6	1	2	1		2	.7	.8				.2	.1	.1	.2		.2																	
"R" translucens																						.2		5	15	20	8	7	7	4	4	3	2	2	
Rotamorphina laevigata														.1				.2	.4	.2	.2	.2	.7	1	.2	.9	.8	.7	.4	1	.4	.6		.3	
Saccamminidae & related forms																								.2		.4	.5		.6	.2	.6	.1	.3		1
Seabrookia earlandi															.3				.5	.2	.2		.2			.3	.2				.2	.1		.2	
Sigmoilina distorta													.4		.8	.9	1	2	1	1	1	1	3	.6	.3										
S schlumbergeri																									.6		.5	.4	.4		.2	.1	.5	1	.3
S. tenuis																									.6	.1	.2	.1	.1		.2	.1	.5	.6	
S sp.						1		.2			.2	.6									.2														
Siphonina bradyana																					1	.5	.8	.4	.8	.3	.1	.2							
S pulchra								.2		.2		.4	.2	.9	1	1	2	1	2	2	3	2	.8	.6	.3		.2		.1						
Siphotextularia curta																																	.2	.2	.3
S rolshauseni																																	.3		.3
Sphaeroidina bulloides															.3		.3	.2	.4	.3	.3	.4	.2	1	4	2	2	3	3	2	2	1	.5	.6	.3
S. compacta																					.2									.3		.2		.5	
Spirillina vivipara						.5		.1		.5				.8	.4	.2	.3	.7	.4	.5	.5	.2	.1												
Spiroloculina cf grata		.6	1	1			.4	.5						.4	1	.7	1	.9	.1	.2															
S saldanii		.1	.2	.2				.1					.1	.4	.4	.2		.2		.1				.2											
Spiroplectammina floridana								.1	.4	.3	.6	1	2																						
Stetsonia minuta		.5	.2				.5	.2						.3	1	1	1	1	.3	.6					.3	2	.8	.2	1	.5	.6	.3	.9	.2	.3
Textularia candeiana		1	.5	2			.9	1	.4	.3	.2	.4	.4	.3						.1			.4	.4											
T canica		.3				1	.5	1	2	2	2	.5	1	1		.2																			
T foliacea occidentalis												.6	.4	.5		.2		.5	.6	.2	.3	1			.2										
T mayori		.1	.2	.2		1	.2	1	.4	.1	.2	.5	.8	.1						.1		.4	.1												
Textulariella spp										.1		1	2	.2																					
Tolypammina schaudinni																																			
Trifarina bradyi															.1			.2							.6	.9	.5	.7	1		.8	.1	.2		
Triloculina cf brevidentata	.8	2	.5	2	.5		2	1		.2	.2		.5	.5							.3														
T tricarinata																																		.5	.3
Trochammina advena																											.4			.8					
T globulosa																																	.3		1
T. cf. japonica																													.6			.1	.2		
T. squamata & related spp.	5	1		.7	2		1	.1	.4																										
T cf tasmanica																											.2					.1			
Uvigerina cuberiana																									.1		.2					.1	.2		
U flintii																	.3	.3	1	.7	1	2	.7												
U. hispido-costata																								3	10	.6	.6								
U laevis													.2	1	3	3	3	7	4	6	4	5	7	8											
U. parvula														.8	2	2	2	4	4	4	6	7	6	2	.2										
U. peregrina																									2	2	7	14	10	7	10	17	25	9	
Valvulineria minuta																.2		.6			.3		.2	.6	.5	1	.1			.2		.3	.3		
Virgulina advena																																			2
V complanata													.1	.1	.3		.5	.2	.1	.1				.4	.4	.3	.4	.2	.5	.3	.4	.1	.2		
V mexicana																.2		.2							.7	.1	.7	.2	.1						
V pontoni														.1			.3				.3														
V punctulata		.2	1	.2	.5		1	1					.2	2	2	2	1	2	.8	.6															
V tessellata																									.3	1	1	.5	1	.2	1	.3			
Wiesnerella auriculata	2	.8	.7	.2		1	.7	.4						.1																					
Miscellaneous spp	.6	3	1	1	5	2	1	2	1	3	3	4	4	3	2	2	6	4	2	3	3	3	4	5	5	4	2	2	.3	.2	3	2	1	3	5

Table 14. Percentage distribution of benthonic Foraminifera in traverse VI (pt.).

TRAVERSE	VII																		
STATION	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	107
DEPTH IN METERS	22	31	46	49	86	146	183	186	237	274	274	320	347	457	585	732	878	2999	3017
TOTAL PLANKTONIC POPULATION	12	8	34	450	150	2 300	27 100	12 800	19 500	14 000	14 800	20 700	60 900	200 000	56 800	16 000	34 600	47 300	40 400
TOTAL BENTHONIC POPULATION	1 900	1 400	1 500	17 100	2 400	5 300	46 700	12 800	27 900	6 600	6 400	3 100	10 300	7 400	5 600	4 500	4 000	1 300	1 600
Adercotryma glomeratum											.1					.2	.1	2	3
Alveolophragmium nitidum													.1	.1			.2	.2	
A subglobosum																		.5	
A sp				.1															
Ammobaculites sp B																		.9	.5
Ammodiscus spp																.1			
Ammoscalaria pseudospiralis	.2	.8																	
A tenuimargo																		1	.1
Amphistegina spp	.2		5	1	11	16													
Angulogerina bella			.3	.6		.1													
A jamaicensis	.5		.3	.2	.8	.3													
Anomalinoides mexicana											.4	.3	.2	.5	.9	1	.9		
Asterigerina carinata	.8	6	3	15	7	1													
Astrononion tumidum												.1		.2	.1	.3			
Bigenerina irregularis	1	5	.7	.7	.3	.3													
B textularioidea	.2	.6	6	2	3	2													
Bolivina albatrossi							.7	.9	3	5	7	8	10	7	3	5	3		
B barbata						.1													
B fragilis				.1	.3	.7													
B goësii						.1	.3	1	1	.2									
B lanceolata			.1		.2	.6	3	2											
B lowmani	.3				.2	2	8	2	4	1	3	.9	1	.8	1	1	.7	2	1
B minima						.1	3	2	6	2	6	6	6	3	.9	.9	2		
B ordinaria						.2	4	3	7	3	4	4	15	8	8	1	.3		.5
B. paula	.2	.3																.2	
B pulchella primitiva	.4		.5	.1	.3	.4	.1	.1	.1								.1	2	.5
B striatula spinata						3	.7	1	.5										
B subaenariensis mexicana							4	12	10	11	9	2	.3						
B subspinescens					.2	.3	.8	1	3	2	2	2	2	1	.9	.4	.2	.2	
B translucens										.2	.4	.8	.2	.4	.4				
B. sp.														.1	.6	.5	.7		
Buccella hannai	.5	.8	.1	.2	.3		.1												
Bulimina aculeata											.1	.1	1	.8	3	2	3		
B alazanensis														1	3	5	6	.2	
B marginata							.1	1	1	.7	.3	.3	.2						
B. spicata									.8			.6	.6	.2	.3	.3	.7		
B. striata mexicana												.1	.1	.2					
Cancris oblonga			.3	.1	.3	.6	.1		.3										
Cassidulina carinata				.1			2		1	4	1	2	1	3					.5
C aff crassa						.4	.6	.8	.2				.9	2	.3		.1		
C curvata					.4	.7	4	5	5	1	2	1	1	4	2				.5
C laevigata												.1							
C. neocarinata					.2	3	7	11	8	2	5	9	5		2	.5	.1		
C. subglobosa & variants	.2		.7	.6	3	9	4	2	6	4	7	6	4	6	9	16	9	1	1
Cassidulinoides tenuis													.1	1	1	.3	.3		
Chilostomella oolina										.2		.5	.2	.8	1	.7	.4		
Cibicides corpulentus						.1	.1	1	.3	.5	.1	.4	.2	.1	.3		.1		
C. deprimus	1	1	.7	.7	1	.9	.1	.4	.1			.3	.1	.2			.3		
C. aff. floridanus					.6	2	7	4	.9	5	2	3	2	1	3	2	1		
C io					.1														
C. kullenbergi																	.6	1	.5
C. mollis						.3	.1							.2					
C. protuberans	.3		.5	.8	.9	4	1	4	.9	1						.3	.3		
C. robertsonianus										1	.1	.1	.1		.7	.3	.4	2	2
C. rugosa																3	.5		
C. umbonatus							1	3	2	.5	2	3	1						
C. wuellerstorfi														.1	.9	.5	1	21	15
Cibicidina strattoni	9	19	5	6	2	.4													
Conorbina orbicularis					.3	.2													
Dentalina - Nodosaria										.2		.3	.4	.3		.1	.2		

Table 15. Percentage distribution of benthonic Foraminifera in traverse VII (pt.).

TRAVERSE	VII																			
STATION	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	107
DEPTH IN METERS	22	31	46	49	86	146	183	185	237	274	274	320	347	457	585	732	878	2999	3017
"Discarbis" bulbosa			.4			.1	.1												
Eggerella bradyi																.2	.4	3	1
Elphidium advenum	.5	2	.7	.6	.5														
E. discoidale	2	7	.7	.6	.1	.1													
E. gunteri	.8			.4															
E. poeyanum	1	.6																	
E. spp.	4	1	1	.9	5	2	.3												
Epistominella decorata																		13	18
E. exigua													.4	3	6	8	14		.5
E. rugosa												.1	.9	2	1	3	2		1
E. vitrea				.1		.5	.3	.2			.3	.1	.2	.4	.4	.2			
Epanides antillarum	.2		3	.6		.1											1	.5	4	5
E. polius																				1
E. regularis																				
E. repandus		.3	.3		.3	3														
E. tumidulus																			3	3
E. turgidus								2	.9	4	1	4	1	.4	2	4	7	5	5	8
Pseudoepanides umbonatus									.1		1	.6	.5	.2	.3	.1	.4	.3	3	3
Gaudryina cf. aequa				.2																
G. (Pseudogaudryina) atlantica									.1	.1	.5									
G. flintii																	.2			
G. cf. minuta	.5	1							.1			.1	.1	.2	.1	.1	.1	.2		
Globabulimina affinis & variant									.1									.1	3	1
Globulina caribaea		.6	1																	
Glomospira charoides									.1		.2		.3					.5	.5	
G. cf. gordialis																		.3	1	
Guttulina australis	.1	.3	.3																	
Gypsina vesicularis			.5	.5	.4	.3														
Gyroidina neosoldanii								.1										.1	.8	
G. orbicularis							.3		.5	.2	.6	.1	.4	.2	.4	2	2	.2		
Gyroidinoides soldanii altiformis								.2	.1		.3	.3	.2	.6	.6	.7	.3			
Haplophragmoides bradyi													.1	.1	.1	.6	.3	.2	2	
Hoglundina elegans						.2	.3	1	.8	.5	.3	.5	.4	1	1	1		5		
Hormosina sp.												.1	.1			.2				
Karreriella bradyi							.4		.7	.3		.2				.1	.4			
Lagena spp. & related forms	.2		.8	.2	.2	.6	.4	1	1	2	.8	1	.6	2	2	3	3	6	3	
Laticarinina pauperata													.2		.3	.9	1	.9		
Lenticulina peregrina							.1	.1	.2		.3	.5	.5	.4	.3	.8	1			
Liebusella spp.						.2	1		.6	.2	.2									
Laxostomum abruptum														.1	.1	.6	3	.3	.5	
Marginulina marginulinoides								.2	.1											
Miliolidae	14	9	10	15	11	6	2	1	.8		.1	.3	.2							
Nadaboculariella cassis	.5	.3	1	7	2	.8														
Nodosaria hispida													.1	.2	.3					
Nonion farmosum						.1	.1	.3	.8	.1		.3				.1				
N. pompilioides																		2	2	
Nonionella atlantica	2	2	1	1	1	.7						.1	.1							
N. opima	.9		.3																	
Nouria polymorphinoides	.1	.3	.1																	
Osangularia cultur															.4	3	3	3	.5	
Peneroplidae	2	4	14	10	5	.5														
Planarbulina mediterranensis		.3	.9	.3	.6	.3														
Planulina ariminensis								1	.6	.5	.3	.4	.9	2	1	.2				
P. exarna	2	13	9	8	3	2	.4	.6	.3											
P. favealata							4	3	3	3	2	.9	.2							
Plectina apicularis									.2					.1			.1	3	2	
Proteanina atlantica	.1							.1		.2										1
P. difflugiformis													.1					1		
Pseudoclavulina mexicana						.2		.1	.2	.3	.5	.3	.4	1	.3					
P. aff. novangliae							.1	.3	.1		1	.3	.3	.1						
Pseudoglandulina comatula							.2		.1	.1										
Pullenia bulloides							.3	.3	.2	.9	.7	.9	.8	.6	.7	.3	.5	.5	1	1
P. quinqueloba							.2	.3	.6	.1	.5	.4	.4	.2	.7	.8	1	2	.9	2
P. sp.																		.3		
Pyrgo murrhina									.1	.2	.4	.1	.3	.2		.4	.8	.6		
P. cf. nasutus	.4			.2		.3						.1								
Quinqueloculina bicostata	.3	.6	2	.1	.2															
Q. compta	1	2	.8	.1	.2	.3														
Q. horrida	.3		2	1	.5	.3			.1			.1	.1							

Table 16. Percentage distribution of benthonic Foraminifera in traverse VII (pt.).

TRAVERSE	VII																		
STATION	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	107
DEPTH IN METERS	22	31	46	49	86	146	183	186	237	274	274	320	347	457	585	732	878	2999	3017
Quinqueloculina lamarckiana	3	1	4	3	2	2	.1		.1		.1								
Q cf polygona			.3			.2													
Q sabulosa	.2	.6		.2															
Q. venusta																		.9	.5
Rectobolivina advena		.3	.1	.8	.7	.6	.3												
R. dimorpha															.1	.1	.2		
Reophax bilocularis												.4	.1	.3		.4	.4		
R. distans delicatulus																		3	1
R. guttifera										.2			.1						
R hispidulus			.1					.1	.1	.2	.1	.3	.2	.2				.8	.5
R irregularis			2	2	1	1													
R. scorpiurus																		.5	
Reussella atlantica	1	2	3	1	.6	1	.4	.1											
Robertina bradyi							.1					.1							
Robulus ssp			4	1	1	2	3	3	3	2	1	1	1	.8	.2	.2	.1		
Rosalina bertheloti					.1	.4	2	1	.9	.7	.3								
R cf. concinna	13	7	4	8	13	5	2	.4		1	.3	.4	.2	.1			.1		
R. floridana	3	.6	.4	.2	.9	.1	.3												
R. floridensis				.3	.4	.8													
R parkerae	.4	.6		.1	.7	.6	.1		.1										.5
R suezensis		.8	.9	1	1	.9	2	2	2	1	.3	.3							
"Rotalia" beccarii variants	24	4	1	.5	.1														
"R." translucens							.1		1	10	14	16	19	25	27	11	5	.2	.5
Rotamorphina laevigata						.1	.1	.9	.7	.5	2	.3	.1	.4		.6	.9		
Saccamminidae & related forms																.1			
Seabrookia earlandi			.1		.1	.2			.1	.7	.5	.5	.1	.4	.5	.4			
Sigmoilina distorta					.2	.1	1	.5	.5	1	2	2	2	.2					
S. schlumbergeri								.4			.1		.5	.5	.4	.2	.3	1	
S tenuis												.1	.1	.1	.4	.3	.6		
S. sp					1	3			.2										
Siphonina bradyana								.4				.5	.4	.6	.1				
S pulchra				.3	.1	.7	2	2	.8	1	.5	.1	.1	.4					
Siphotextularia rolshauseni																		.3	1
Sphaeroidina bulloides						.3		.5	.6	.7	1	2	.9	1	.9	2	2		.5
Spirillina vivipara	.1			.2	1	.7	.3												
Spiroloculina cf. grata	.5		.3		.3	.2													
S. soldanii	.1	.3	.1			.2													
Spiroplectammina floridana			.5	.2	2	.3													
Stetsonia minuta						.1	.3	.1	.3				.2	.7	.4	.5	.6		
Textularia candeiana	.8	.3	1	2	.7	.2	.3	.2	.2	1	.4	.3	.5						
T. conica	.2	.8	1	.5		1		.4		.2	.3								
T foliacea occidentalis					.2	.4		.2											
T. mayari	1	2	.7	.9															
Textulariella spp.				.4	2	2		.1											
Tolypammina schaudinni																			.5
Trifarina bradyi										.2		1	1	1	2	.9	.9		
Triloculina tricarinata												.1							
Trochammina globulosa																		1	
T. cf japonica						.1						.1				.2			
T. quadriloba									.1										
T. squamata & related spp.	1			.3	.1														
Uvigerina auberiana												.4			.1		.1	.2	
U. flintii					.3	.3	.4	.6	.4	1	.3	.1	.1						
U hispida - costata												2	6	3	.1				
U. laevis					.2	1	6	4	6	9	5	3	.6	.1					
U. parvula						.4	9	8	4	3	2	.8	.2						
U. peregrina									.3	2	2	3	2	1	2	6	14	.2	
Valvulineria mexicana																			.5
V. minuta						.2	.3	.2	1	1	.9	.9	.7	.8	.6	.7	.3		.5
Virgulina advena																		.8	
V complanata					.1		.3	.2	.1		.5	.3	.2	.3	.7	1	.5	.2	
V mexicana												.6	.5	.3			.1		.5
V. pontoni	.2		.1																
V punctata	.9	.3	.8	.3	.6	.9		.1											
V tessellata														.6	.6	.7	.4		
Wiesnerella auriculata	.3	.3			.8	.1		.1											
Miscellaneous spp	2	1	2	1	5	3	6	4	2	6	2	3	2	3	2			5	5

Table 17. Percentage distribution of benthonic Foraminifera in traverse VII (pt.).

TRAVERSE	VIII																								
STATION	172	171	170	169	168	167	166	165	164	163	161	160	159	158	157	156	155	154	153	152	151	150	149	148	146
DEPTH IN METERS	?212	15	20	20	22	26	29	31	31	36	35	46	51	60	62	58	79	117	146	183	366	585	914	1730	3164
TOTAL PLANKTONIC POPULATION	2	0	0	0	0	0	0	0	64	200	1 700	88	175	650	1 600	500	3 000	37 200	38 500	38 500	25 900	16 200	14 900	15 700	65 000
TOTAL BENTHONIC POPULATION	800	2 100	5 400	20 500	900	2 300	5 800	36 400	29 900	18 900	60 500	4 900	3 600	5 700	17 400	22 900	7 500	19 400	19 800	23 700	11 100	3 300	3 000	1 600	1 600
Adercotryma glomeratum																									2
Alveolophragmium nitidum																							.3	.2	
A. subglobosum																							.3	.2	
A. wiesneri																							.4		
Ammobaculites sp. B																								.2	2
Ammodiscus spp.																							.1		
Ammoscalaria pseudospiralis																				.3					
A. tenuimargo																									2
Amphistegina spp				.8	3	.4	.2		.1	3	2	2	25	4	2	3	17	1							
Angulogerina bella																	.2	.5		.3					
A. jamaicensis											.1			.4	.1					.3				.2	
Anomalinoides mexicana																						.5	.5	.5	
Asterigerina carinata	5	15	36	18	24	31	28	8	5	2	.1	7	7	8	19	31	2		.3	.3					
Astrononion tumidum																					.1	.4	.4		
Bigenerina irregularis	.3		2	.8	.2	.7	.8	1	2	3	2	1	1	2	2	.6	1	.5		.6					
B. textularioidea			.1			.6	.7	1	1	2	.7	2	9	9	5	.4	3			.3					
Bolivina albatrossi					.2															.3	6	4	5	.5	
B. fragilis														.1	.3			.3	.3	2					
B. goësii																			4	1					
B. lanceolata															.1			2	4	2	.3				
B. lowmani										.2	.3	.2	.1		.1	.1	.2	2	2	4	2	2	.4	8	.8
B. minima																			4	12	14	2	.1		
B. ordinaria																			.3		5	5	.8		.5
B. paula																								.7	.8
B. pulchella primitiva				2			.3	.2	.4	.2		.2	.1	.4					.3			.1			
B. pusilla																								2	.2
B. striatula spinata																					.3				
B. subaenariensis mexicana																			.3	.8					
B. subspinescens														.3	.1	.1	.4	2	1	2	2	.6	.4		.5
B. translucens																						.2			
B. sp.																						1	.8	.7	
Buccella hannai		.2	2	1	.4	.1	.3	1	1	2	1	.2		.3	.3	1									
Bulimina aculeata																					2	1	3	9	
B. alazanensis																						2	7	3	.2
B. spicata																			.6		.3	.1	1	.7	
B. striata mexicana																					.1			1	
Cancris oblonga									.1	.3	.6	1	.8	.7	.7		.2	.5	2						
Cassidulina carinata											.2	.2	.2		.1		.6		.3	.8	3	.2		5	.2
C. aff. crassa																				.3	2	.6			
C. curvata														.7	1	.6	4	4	3	3	.3	2			
C. laevigata																	6	.3						.2	
C. neocarinata																	.2	.3	5	3	6	2			
C. subglobosa & variants	.3										.3	.3	1	.6	.3	.4		8	4	5	6	10	9	10	5
Cassidulinoides tenuis																						1	.8		
Chilostomella oolina																					.4	2	.4		
Cibicides corpulentus																		.2	.6	.3		.8	.5		
C. deprimus	.5	3	2	6	19	4	6	7	4	2	2	1	.5	.4	1	.4	.8	1							
C. aff. floridanus																	.8	4	3	4	2	1	2	.2	
C. io													.2	.4	.5	1	.4	.7							
C. kullenbergi																	.4					.2	.3	1	.5
C. mollis														.3	.6	.4		1	.6						
C. protuberans							.1			.3	1	2	2	3	3	2	11	10	6	7	.4	.2			
C. robertsonianus																						.5	.9	.5	2
C. rugosa																						.1	.8	.2	
C. umbonatus										.2									.3	2	3	.4			
C. wuellerstorfi																						1	2	1	12
Cibicidina strattoni		.5	.8	5	2	3	4	8	8	8	4	2	1	4	6	3	1	2	1						

Table 18. Percentage distribution of benthonic Foraminifera in traverse VIII (pt.).

TRAVERSE	VIII																								
STATION	172	171	170	169	168	167	166	165	164	163	161	160	159	158	157	156	155	154	153	152	151	150	149	148	146
DEPTH IN METERS	212	15	20	20	22	26	29	31	31	36	35	46	51	60	62	58	79	117	146	183	366	585	914	1730	3164
Conarbina orbicularis							.3	.2	.3		1	.8	.7	.6	.3			.7	.6						
Cyclammina spp																						.1			
Dentalina – Nodosaria															.1		.2		.6			.2	.3	4	
"Discorbis" bulbosa								.3	.1		.4	.2	.1		.1		.2	1		.8					
Eggerella bradyi																				.3			.1	1	.8
Elphidium advenum	.3	.2	2	2	.7	1	.6	.3	.2	.8	.2	.7	.4		.6	.8		.3							
E. discoidale	.8	.5	2	3	1	1	3	3	5	6	2	.3	.5	1	.8	.8				.3					
E. gunteri	1	.3	.3	.7	.4	.4	.4	1	3	2	2	1	.4	.7	1	.3	.6	.5		.3					
E. poeyanum	2	.4	1	1	.2	.1	.4	1	.4	.8	1	.3	.5	.3	.1	.1									
E. spp.	2	3	2	4	.2	.9	2	1	.6	1	3	1	.3	.4	.8	.1	.4	.8							
Epistominella decorata																								3	13
E. exigua																					.6	3	9	.5	3
E. rugosa																					2	1	.7		
E. vitrea																						.8	.4	1	
Eponides antillarum							.3	.5	.5	1	.1	.7	.8	1	1	.8	.2								
E. palius																						.1	.3	.7	5
E. repandus					.9	.2	.1	.1	.3	.2		.2	2	.3	.2	.3	.4								
E. tumidulus																									4
E. turgidus																		.3		.3	.1	3	5	3	8
Pseudoeponides umbonatus																					.3	.2	.3	.2	2
Gaudryina cf aequa											.8	.2		.4		.1	.6	.8							
G. (Pseudogaudryina) atlantica																			.6						
G. flintii																							.3	1	
G. cf. minuta																						.4	.3		
Globobulimina affinis & variant																									.2
Globulina caribaea	.5	.1		.2	.2		.2					.2				.3									
Glomospira charoides																							.5	.7	1
G. cf gordialis																									1
Guttulina australis	.3	.1	.3	1		.3	.4	.4	.4	.5	.3	.5	.1	.1	.4		.2								
Gypsina vesicularis							.1	.2		.2		.7	.8	.3	.4	.1	.8								
Gyroidina neosoldanii																									.5
G. orbicularis																				.3	.3	.1	2	2	2
Gyroidinoides soldanii altiformis																					.4	1	.4		.2
Haplophragmoides bradyi																						.4	.4		1
Höglundina elegans																		.2	.3	.5	.9	1	1	4	
Karreriella bradyi																					.1	.2	.4		
Lagena spp & related forms										.2				.1	.2	.1	.2	.2		1	1	2	3	2	5
Laticarinina pauperata																					.1	.1	.8	.7	2
Lenticulina peregrina											.1				.1						.4	.8	.7		
Liebusella spp																			.3						
Loxostomum abruptum																		.3				.5	2	3	.2
Marginulina marginulinoides																		.3							
Miliolidae	42	21	9	11	5	8	16	14	14	15	20	18	5	10	13	11	6	7	3	2	.3	.1		.5	
Nodobaculariella cassis	4	2	.6	.5	.9	4	4	2	2	2	3	5	1	3	3	4	2	.5		.3					
Nodosaria hispida																					.4	.1			
Nonion formosum															.1		.2	.7		.3		.2	.1	1	
N. pompilioides																									2
Nonionella atlantica		.4			.2		.8	2	2	3	4	2	.8	1	1	.6	.4	.7	.6	.3					
Nouria polymorphinoides						.1	.1		.1																
Osangularia cultur																						.2	2	1	
Peneroplidae	16	16	16	17	25	2[illegible]	10	13	18	8	6	18	8	19	8	16	2	1		.3					
Planorbulina mediterranensis	.8	.1	.1	.1	.2			.1	.1	1	.6	.2	.4	.4	.6	.3	.8	.8	.6						
Planulina ariminensis																				1	1	.7			
P. exorna						.1	.3	6	8	11	15	5	4	8	11	11	8	5	.6	.5	.3				
P. foveolata																	.4	.7	2	2					
Plectina apicularis																						.1		.2	2
Proteonina difflugiformis													.1									.1		.2	1
Pseudoclavulina mexicana																		.2							
P. aff. novangliae																		.3	1		.1				
Pseudoglandulina comatula																				.3					
Pullenia bulloides																				.3	1	.5	.3	1	.8
P. quinqueloba																		.2	.3	.3	.4	.7	1	.2	2
P. sp.																								.2	.2
Pyrgo murrhina																					.4	.1	.4	.5	2
P. cf. nasutus								.1	.1	.3			.5	.1	.2		.2	.5	1		.7				
Quinqueloculina bicostata			.5	.3	.7	2	.8	.5	.6	1	.4	.3	2	.4	.3		.2		.3						
Q. compta	1	.1	6	3	3	2	2	3	3	2	1	2	1	.7	.3	.1	.2								
Q. horrida												.2	.4	.8	.9		.8	.2	.3		.9				

Table 19. Percentage distribution of benthonic Foraminifera in traverse VIII (pt.).

TRAVERSE	VIII																								
STATION	172	171	170	169	168	167	166	165	164	163	161	160	159	158	157	156	155	154	153	152	151	150	149	148	146
DEPTH IN METERS	?12	15	20	20	22	26	29	31	31	36	35	46	51	60	62	58	79	117	146	183	366	585	914	1730	3164
Quinqueloculina lamarckiana	.3	.5	6	4	4	5	3	5	7	5	5	5	6	5	4	3	5	1	2						
Q cf polygona	1	.1	.6	.4		.3		.2	.3	.2	.5	.2		.4			.6	.2							
Q sabulosa			.4																						
Q. venusta																									2
Q sp.																						.2	.4	1	.5
Rectobolivina advena									.2	.2	.5	.2	.2				.2				.1				
R. dimorpha																						.1	.1		
Reophax bilocularis																						.6	.9		
R. distans delicatulus																									.8
R hispidulus																							.3	.2	.5
R irregularis												.2	.9	1	.6	.4	2	2	6	1					
Reussella atlantica							.3	1	1	2	2	.8	2	1	1	1	4	.8	1						
Robertina bradyi																		.2			.1			.2	
Robulus spp								.1					.5	.3	.7		.6		3	2	2	.1	.3	.7	
Rosalina bertheloti											.2	.3						.7	3	3	.3				
R cf. concinna	13	28	5	11	3	4	6	4	1	1	4	2	2	.4	.4	.4	.6	1	2	1			.3		
R floridana	1	4	2	5	.9	3	3	5	5	2	2	4	.2	.4	.6	.3	.6	1							
R. floridensis														.1											
R parkeroe						.1	.4	.3	.2	.2	.6	1	1	.1	.7		.2	.5	.6	.8		.1			
R suezensis							.4	.9	.5		1	2	2	1	.8	.7	.4	6	5	6	.1				
"Rotalia" beccarii variants	1	1	.5	.6	.2	.2	.3	.5	.1			.3	.1		.7		.2	2							
"R." translucens																					1	21	5	1	
Rotamorphina laevigata																			.3	3	.1	.5	.7		.2
Saccamminidae & related forms																									
Seabrookia earlandi																		.5			.4	.1	.3		
Sigmoilina distorta																		1	.3	.3	.6				
S. schlumbergeri																						.5	2	.7	.8
S tenuis																							.4	.7	
S sp.				.3	.2				.1				.4		.4		.8								
Siphonina bradyana												.2		.1	.4			.7	1	.8	.9	.6			
S pulchra											.3	.2		.4	.2		.6	.8	1	2	.1				
Siphotextularia curta																							.1		
S rolshauseni																									.2
Sphaeroidina bulloides																				.3	2	2	1		
S compacta																		.3			.4				
Spirillina vivipara							.1	.1			.2				.1		.2	.7	.6						
Spiroloculina cf. grata			.2	.4		.1	.2	.3		.3	.3	2		.3				1		.8	.1	.2			
S saldanii				.1	.2	.1	.1	.2	.1		.3	.2		.3	.2		.2	1	.3	1					
Spiroplectammina floridana											.1		.2	.7	.6	.3	2	.2							
Stetsonia minuta																				.5		.4	.4	.2	
Textularia candeiana	3	.7	1	1	.4	.4	1	2	1	4	.5	1	1	2	2	1	2	2	.3	.3				.2	
T. conica	.3		.2				.1	.4	.3	.8	.5	.8	1	1	.8		1	.7	.6						
T. foliacea occidentalis															.1		.6	.8	1	.3				.2	
T mayori								.8	.5	1	2	.2	.2	.1	.3	.1	.2	1	.3						
Textulariella spp.										.2			.7					.2		.3					
Talypammina schaudinni																						.1		.2	.5
Trifarina bradyi														.1							2	2	2	9	
Triloculina cf. brevidentata	2	.5	.7	.2		.4	.7	1	.6	1	1	.7	.8	.6	.7	.6	.6	2	.6	.5					
T tricarinata																						.2			
Trochammina globulosa																									1
T quadriloba																									.2
T. squamata & related spp.		.4				.2					.2	.2	.1				.2								
Uvigerina auberiana																					.1			9	.8
U. flintii																		.7	5	2					
U hispido-costata																					.7				
U. laevis																		2	3	5	1			.2	
U parvula																		2	1	3	.6				
U peregrina																					4	4	14	4	.2
Valvulineria mexicana																							.1		
V. minuta																	.2	.3	1	.3	.7	.6	.3		
Virgulina advena																								.2	.2
V. complanata																						.2	.7	.2	.2
V mexicana																					.3	2			
V. pontoni																		.2							
V. punctata		.1		.1				.7	.3	2	1	1	.4	.3	5	.1		.5	.3						
V tessellata																						1	.4		
Wiesnerella auriculata							.5	.5	.2	.2	.2	.5	.1					.2	.3						
Miscellaneous spp.	1	1	.7		.7	.3	1	2	1	.7	2	2	2	1		1	2	2	6	3	2	6	1	3	4

Table 20. Percentage distribution of benthonic Foraminifera in traverse VIII (pt.).

TRAVERSE	IX								X									XI													
STATION	138	140	141	142	144	145	137	108	136	134	131	130	133	129	128	127	126	117	118	116	124	123	122	121	120	113	112	110	111	1	2
DEPTH IN METERS	183	256	320	421	914	2268	3160	3072	1051	950	1920	3200		3180	1737	2150	1317	139	146	155	914	1326	1829	2560	3246	2280	3283	3218	3251	3237	3237
TOTAL PLANKTONIC POPULATION	20 000	80 000	60 000	100 000	40 000	30 000	100 000	80 000	200 000	60 000	10 000	10 000	80 000	90 000	80 000	200 000	30 000	40 000	50 000	60 000	100 000	30 000	70 000	50 000	20 000	10 000	60 000	100 000	40 000	20 000	70 000
TOTAL BENTHONIC POPULATION	9 800	8 800	26 800	32 400	4 200	900	1 500	1 700	3 900	3 500	1 100	275	1 100	2 000	2 800	4 300	1 300	12 100	12 400	11 800	8 000	1 100	1 300	900	375	325	1 600	1 400	600	275	625
Adercatryma glomeratum						.2	2	1	.1			1	.7	5	1		.2				.1	.1	.3		5	.6	1	1	4	4	3
Alveolophragmium nitidum							1					.4					.2				.1		.6	.4							4
A. ringens										.1												.2	.2	.2							
A. scitulum																								.1							
A. subglobosum							.5	.2						.4							.1		.2	.2	.5						
A. wiesneri									.1						.4		.2														
A. sp.							.3											.1				.4		.1		.6					
Ammobaculites sp. B						.2			.1	.2		3	2		.3	.2						.3	.5	.6							
Ammodiscus spp.					.2		.3					.7		.4			.2					.1		.4						.4	
Ammoscalaria tenuimargo						.7	.3		.1	.2		.4	.4	2		.2						.1			3		.5			1	1
Amphistegina spp.	3																	6	5	5			.2				.3	.3			
Angulogerina bella										.1													.3		.3						
A. jamaicensis		.4																			.4	.1									
Anomalinoides mexicana		.1		.1	.2					.5					.1											.3					
Asterigerina carinata																		.4													
Astrononion tumidum					.2				.2								.3							.1							
Bigenerina irregularis	.8																														
B. textularioidea	2																	.1	.1	.7											
Bolivina albatrossi		1	2	.7	3				3	2	2	.4			.1		3				.5	.3	.2	.1	.3	.3					
B. fragilis		.3																.4	.5			.1									
B. goësii	.7	7	1	.2													.2	4	6	5	.2			.1							
B. lanceolata	.8	1	.5	.2	.6				.3	.1	.8						.3	2	4	.8	1	.3				1	.5	.6			
B. lowmani	.7	2	2	.9	.2	.4		1	3	2	1	1	2		2	.6	1	.2	3	.5	3	2	2	4	.5	4	2	2		.7	.6
B. minima	2	3	2	1	4				.4	.6	.7	.7	.7		.1		.2	1	2	1	.4	.2	.2		.3	.3					
B. ordinaria		2	4	1	.4			.2	.6	1			.7		.1		.2		.1		1	.6	.6	.4		1					
B. paula	.2			.3					.4						.3		.3				.3		.6		1	.3	.5	.8		.4	
B. pulchella primitiva								.2	.1	.1					.3						.2	.3	.5	.1	.5	.3	.5	.6	.7	.4	3
B. pusilla		.1				.2					.7	.4				.2	.3						.2	.6		.3	.3				
B. subaenariensis mexicana	.2	.1													.1																.6
B. subspinescens	1	2	4	2	.8				.9	2	1	1	.4		.9	.2		1	2	2	1	1	1	1						.4	
B. translucens		.1								.1												.1				.9			.7		
B. sp.				.1	.6	.2			.9	.7	.4	.7			.7		.9				.7	.1	.3	.5		.3					
Bulimina aculeata			.7	2	4		1		2	2	1	.4			1	2	10				2	.9	.8	.2		.3					
B. alazanensis				.5	15	.2			15	11	2	1	.7		.9	.7	4				7	3	.8	.2	.8	.3	.8		.7	.4	.6
B. spicata		.7	.6	.2	.6		2		2	12					.1	.9	.8			.3	.5	.2	.2	.1							.6
B. striata mexicana		.2		.3		.9	.8		.1					.4	.4	1							.3	.1							
Cancris oblonga	.2	.1								.1								.3		.5	.5					.3				.7	
Cassidulina carinata		1					1	.7	.2	.2			.4			.6															
C. aff. crassa	1	2	2	4	.2				.6	.8			.4		.3	.2	.3	2	.9	2	.9	.3	.5		.8		.5				
C. curvata	5	2	5	4						.5	1					.2		3	2	1	.8	.1	.2			.3					.6
C. laevigata																	.3	3	2	2	.3					.3	.8				
C. neocarinata	1	7	7	3	.2					.2	.4						.2	.5	.5	.3	.3									.4	
C. subglobosa & variants	3	4	10	11	7	10	3	3	10	8	7	3	9	2	14	12	9	3	.9	4	15	15	7	11	3	8	3	3	1	4	4
Cassidulinoides tenuis		.1		.1	.2					.3					.1		.5					.1				.3				.4	
Chilostomella oolina										.3						.4					.1										
Cibicides corpulentus	.2			.1	.7				.2	.3					.1		.5				.1	.6									
C. deprimus	1	1		.8	.6										.3			1	.8	2	.4			.1		.6					
C. aff. floridanus	7	.8	2	2	.8				2	1						.2	.8	.5	.8	1	1	.1									
C. kullenbergi						.2	.3		.1			2	1		.3	3						.1	.5	.3		.3		.6	.7	.4	.6
C. mollis																		.4	.1												
C. protuberans	21	9	2	.1													.2	15	17	18	.8	.2	.3								
C. robertsonianus				.7	.9	2	2	2	2	.2	1	.7	3	.4	1	.6	1			.1	2	2	.3	1	1	.6	2	.6	.7	.7	
C. rugosa						.2			.2		.4				.3	.2	.2				.2	.5	.2								
C. umbonatus	.3	2	.5	.7																	.1										
C. wuellerstorfi					.8	4	37	49	.9	.2	.4	5	5	47	2	6	2				1	1	3	1	17	.3	24	27	38	34	35
Cibicidina strattoni	.3				.2													.4													

Table 21. Percentage distribution of benthonic Foraminifera in traverses IX-XI (pt.).

TRAVERSE	IX								X									XI													
STATION	138	140	141	142	144	145	137	108	136	134	131	130	133	129	128	127	126	117	118	116	124	123	122	121	120	113	112	110	111	1	2
DEPTH IN METERS	183	256	320	421	914	2268	3160	3072	1051	950	1920	3200		3180	1737	2150	1317	139	146	155	914	1326	1829	2560	3246	2280	3283	3218	3251	3237	3237
Canarbina orbicularis																			.1	.3											
Cyclammina spp.																						.2	.2			.3	.3			.7	
Dentalina – Nodosaria	.7	.4		.1	.6		.2	.2	.1	.2			.4		.2	.2		.5	1	.1	2	.2	.6	.1			.3		.7	.4	
"Discarbis" bulbosa																					.6	.3	.3			.6					
Eggerella bradyi				.1		1	.5	.2	.4	.2	1	3	2	.8	.3	.2	.3			.1	1	.6	.2	1	2	.6	1	.6	.7	.7	.6
Ehrenbergina spinea		.4								.5								6	3	3	.8										
Elphidium spp.	.2																	.4		.1	.7		.8	.2				.3			
Epistaminella decarata					.2	19	3	11			19	6	2	2	12	9	2					1	7	5	15	7	17	14	10	8	7
E. exigua			.2	1	16	.7	.5		4	7	6	2	.4		5	3	1				5	2	4	2	1	2	.3	.3		.4	.6
E. rugosa		.8	11	11	1				2	2	3					.4	.2				5	.3	.2	.6			1	.3			
E vitrea				.2	.2	.4				.2											.7	.4		.2		.3		.3			
Eponides palius					.2	2	3	3	.7	.2	.4	3	.4	4	.7	.4	2					.7	.6	.3	4		4	4	6	2	4
E. repandus	.2																	.5	.1												
E. tumidulus						3		1			.7	7	5	1	.7	.4	1				.3	1	1	3	3	2	1	3	1	4	1
E turgidus		.5	1	.2	1	6	.5	6	2	1	11	4	5		3	2	2			.3	3	2	4	5	3	3	.3	2	.7	.4	.6
Pseudoepanides umbonatus	.5	.2	.5	.9		2	5	2	.4	.3	.7		1	2	2	2	.9		.3		.3	.5	1	.8	3	.9	3	3	.7	.4	2
Gaudryina cf aequa																		.7	.1												
G (Pseudagaudryina) atlantica	.2	.1	.1															.3		.1											
G. flintii						.4			.9	.2					1	.2	.6			.3	1	1									
Globobulimina affinis & var.							2	3						1										.1	.3		1	.8			
Glomospira charoides				.2		2	1	.7	.4	.1	.7	9	10	.8	2	.4	2				.1	.9	2	2	1	4	.3	.3	3	3	2
G. cf. gordialis								.2			.7	.4	.4	.8	.7	.2	.5						.8	.4	.8	2			.7		
Gypsina vesicularis																		.3	.1	.1											
Gyroidina neosoldanii	.2	.1	.4	.4		.2	1								.3	.6					.2		.6	.1	.5	.3	.2			.7	.6
G orbicularis		.3	.4	.1	2	.4	2	.5	3	1	2	.7	.4	.8	2	3	3				.7	2	2	.3		2	.3	.3			
Gyroidinoides soldanii altiformis	.2	.5		1	.2	.4		1	.5	.3	.4				.1		.3				.5							.6	.7		
Haplophragmoides bradyi				.1		.6		.7	.1			2	2	.4		.2	.3					1	.5	.2	1	.3	1	.8	.7	1	.6
Höglundina elegans	.3	.8	.2	1	.7	12	6		2	2	5	3	10	4	3	25	7	.1	.6	.8	1	4	3	5		10	9	3	3	5	3
Karreriella bradyi	.3	.6		.3	.4		.3		.5								.2	.5	.4	.4		.2	.2	.2							
Lagena spp. & related forms	1	1	2	4	4	8	2	1	6	3	6	3	9	2	8	2	4	.8	5	.1	4	8	7	10	4	4	4	5	3	4	3
Laticarinina pauperata		.1	.4	1	.9	2	2	.2	1	1	2	.4	1		1	.9	2				1	2	.9	1	.3	.3					
Lenticulina peregrina		.3	.5	.2	1				1	.8	.7				.6		.8		.3		.9	.6	.2								
Liebusella spp.	.8	.2																.3	1	.8											
Laxostomum abruptum		.3	.7	.4		2			.5	.7	1				.7	.7					.6	.3	.2	.8		.3		.8			
Miliolidae	2	3	.8	.9				.2		.1		.4	1		2	.9	1	4	4	1	.8	6	4	3	.5	2	1	.3		.4	
Nodobaculariella cassis	.5																	.5	.5	.6											
Nodosaria hispida				.5																	.2										
Nonion formosum	.3	.3			.4													.7	.3												
N pompilioides						.4	3	3				.7	.7	4										.6	3	.3	4	8	6	3	6
Nanionella atlantica																							.2								
N opima																					.2					.3					
Nummoloculina irregularis			.4	.1											2	.7	.2				3	5	5	1		.9					
Osangularia cultur					4		.5		2	3	1	.4	.4	.4	2	2	2				2	1	2	.6	.5	.6	1	.3		1	.6
Peneroplidae																		.9		.1											
Planorbulina mediterranensis	.3																	1	2	1		.2					.3				
Planulina ariminensis	.2	.7	2	4					.2	.5										.3	.5		.2	.2							
P exorna	.5	.2																.4													
P. faveolata	3	5																2	3	2											
Plectina apicularis							1	.2				2	2	3	.1		.6					.3	.7		2		2	1	2	2	1
Proteonina difflugiformis								.2				3					.3							2	1	.6					
Pseudoclavulina mexicana	.2																	.4	.5	.4											
P aff. novangliae	.3					.2																									
Pseudoglandulina comatula		.2		.1						.1								.3	.3	.4							.3				
Pullenia bulloides		.2		.6	.6	.4	.3	.5	.5	.2	1	.4		.4	2	1	1			.1	1	2	2	.6	1	.6	.3	.3	.7	1	.6
P. quinqueloba	.3	.2	.6	.4	1	.7	.8	1	1	.5	2		1	1	2	.7	2	2	.9	.9	.8	1	2	1	.8	.6	1	1	.7		1
P. sp.						.4		.2	.2			.4		.4	.4	.6						.5	.2	1	1	1		.8	.7	1	
Pyrgo murrhina				.5	1	3	2	.7	1	.9	1	.7	4	2	.4	1	2				.3	.6	.2	2	.5	2	2	.6	1	.4	3
P. cf. nasutus	.5	.2	.4															.3	1	.7							.3				
Quinqueloculina compta																				.1											
Q. horrida	.7	.3																													
Q. lamarckiana	.7														.1	.4		1	.4	.5											
Q cf. polygona	.3																	.1													
Q. venusta						.4	.5					.7	1		.3								.8	.8		.6		.3		.4	
Q. sp.					.7	2	1		.8	.1		2	1	.4	.4	4	.9				.6	1	3	1		.3	.5	.3	1	1	.6
Rectobolivina advena		.1																						.2							

Table 22. Percentage distribution of benthonic Foraminifera in traverses IX-XI (pt.).

TRAVERSE	IX								X									XI													
STATION	138	140	141	142	144	145	137	108	136	134	131	130	133	129	128	127	126	117	118	116	124	123	122	121	120	113	112	110	111	1	2
DEPTH IN METERS	183	256	320	421	914	2268	3160	3072	1051	950	1920	3200		3180	1737	2150	1317	139	146	155	914	1326	1829	2560	3246	2280	3283	3218	3251	3237	3237
Rectobolivina dimorpha				.1																		.1									
Reophax bilocularis				.3								2										.5		.3		.3					
R. distans delicatulus						.4	.5	.2				3	.4	4	.3							.2	.5	1	5	2	1	.6	1	1	3
R. guttifera																										.3					
R. hispidulus									.2	.3		2			.4		.2				.1	1	.2	2	1	.6	.3			1	
R. irregularis	4	.5																.4	.3												
R. scarpiurus												.7																	1		
R. sp.													.4																		
Reussella atlantica	.7														.1			2	.9	1	.8										
Robertina bradyi	.2	.1	.2	.1	.9				.8	.7					2	.7	.6				.7	1	2	.4		2					
Robulus spp	2	2	2	3	.4				.1	.2	.4					.4	.2	3	3	6	.3	.4					.5				
Rosalina berthelati	.8	1							.2									.5	.9	.5	1										
R. cf. concinna		.3							.6	.3							.3	2	.4	.3	2	.3	.5	.7						.4	
R. floridana	.2												.4					.1	.1	.1											
R. floridensis	.7																	.5	.3	.3											
R. parkerae		.2		.2		.7		1	.1				.4	.4	.6		.2		.4		1	.4	.5	.6		.9					
R. suezensis	.2	.5	.6	.3	.4																							.3			
"Rotalia" translucens		2	12	8	3	.4	.5		4	6	5	1	.4	.8	3	.9	4				3	3	1	1	.5		.8	.3			.6
Rotamorphina laevigata	.2	1		.2	.4				.8	1	1	.7	1		.4	.4	.2	.4	.4	.1	.4	.4	.5	.4		2	.3	.3			.6
Saccamminidae & related forms																										.3					
Seabrookia earlandi			.2						.4	.1		.4			.1		.9	.1	.1	.1	.1	1	.5	.9		2		.3			
Sigmoilina distorta		.4													.6			.8		.8	.4										
S. schlumbergeri		.2	.4			.2	.5	2	.4	.3	.4			1	.4	.9	1				.1	.2	.6	.2	1					.7	
S. tenuis	1	.8	.6						.7	.2		.4					.2	1	.9		.7	.5								.4	
S. sp	.7	.7																.3		.3											
Siphonina bradyana	.2	.7	.6	.4						.1								1	.8	1											
S. pulchra	.5	1	.1	.4														1	.4	.4											
Siphotextularia curta					.2				.3	.3					.1	.2	.5				.1	.4	.7	.3							
S. rolshauseni												.4			.1		.2							.1	1		.3	.8		.4	1
Sphaeroidina bulloides	.3	.7	.6	2	.6	.2			1		.4						.5			.1	.9	.5	.6			.6	.8				
S. compacta									.2						.3		.3		.1			.5	.2			.3					
Spirillina vivipara					.2				.1									.3	.1												
Spiroloculina soldanii	.3	.1	.1						.1										.1	.5											
Spiroplectammina floridana	.3																	.7	.5	.4											
Stetsonia minuta		.1							.5	.3			.4				.2	.3			.1			.1		.6		.3	.7		
Textularia candeiana	3	2	.4															1	1	1											
T. conica	1	.2																1	.9	2											
T. foliacea occidentalis	3	1																1	.8	1											
T. mayori	.2	.2																.3	.1												
Textulariella spp.	2	.4	.1															1	1	3											
Tolypammina schaudinni						.9						4	2	2	1		.6					.2	.5	3		2				.4	
Trifarina bradyi	.5	.5	6	8	3				3	2	2	.4	1		.4	.2	.2	.3	.4	.5	2	.2		.2		.9				.4	
Triloculina cf. brevidentata	.5	.5														.2		.8	.1	1											
T. tricarinata					.2				.2			.7			1		.2					1	.3	.9		.6			.7		
Trochammina globulosa						.4	.3		.1			1	2		.3		.8					.3	.2	1		3					
T cf japonica												.4			.3		.3						.2	.4		.3					
T quadriloba																									1						
T squamata & related spp									.1															.1							
T cf. tasmanica						.2						2										.2		.9		.6				.4	
Uvigerina auberiana		.2	3	1		.7	3	.2	.7	.8	.4				.4	1	.5				.2	.2	.5	.6		.3			2	.7	.6
U flintii	3	4	.4	.2														2	3	6											
U hispido-costata		.1	.6	1					.3	2																					
U laevis	1	2		.2					.1	.3	.7		.4		.1		.2	1	1	.7	.8		.8	.1		.3	.5				
U parvula	3	6	.2															3	5	4											
U. peregrina				.3	12	.9	2		5	8	.7				.9	.9	6				.8	2	.3	.3							
Valvulineria mexicana								1																			.3	.6			.6
V minuta		.4	.1	1	.9	.2			.2	.7	.7						.6		.4		.5	.4	.2	.3	.6	.3					
Virgulina advena						.9		.2					1			.4								.1		.3					1
V complanata		.1	.6	.2		.4		.2		.5			1				.2	.1		.1	.1	.3	.3								.6
V mexicana		.1										.4			.1	.2								.1							
V. pantani																						.1				.3					
V. punctata										.2								.1	.1		.1	.2	.2	.4		.3					
V tessellata																					.1										
Miscellaneous spp.	5	4	4	6	.1	5	4	1	3	3	3	4	3	2	5	2	4	4	4	8	3	7	9	8	7	7	3	7	5	5	.6

Table 23. Percentage distribution of benthonic Foraminifera in traverses IX-XI (pt.).

TRAVERSE	VII																					
STATION	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	1073			
DEPTH IN METERS	22	31	46	49	86	146	183	186	237	274	274	320	347	457	585	732	878	2999	3017			
TOTAL PLANKTONIC POPULATION	12	8	34	450	150	2 300	27 100	12 800	19 500	14 000	14 800	20 700	60 900	200 000	56 800	16 000	34 600	47 300	40 400			
Candeina nitida																.4	.2	.3	.3			
Globigerina bulloides	17			4	18	5	16	17	19	13	18	13	10	6	9	12	14	14	16			
G. digitata											1		.1	.1	.2	.4		.1				
G. eggeri			24	4	19	23	9	11	7	9	7	9	11	8	8	11	9	8	6			
G. inflata						1	2	2	3	1	1	2	1	.9	.7			.1				
G pachyderma																	.2	.7				
G sp.						2	4	2	3	2	3	.8	3	4	2	1	1		1			
Globigerinella aequilateralis					1	3	.7	1	2	3	4	3	3	3	5	5	2	5	6			
Globigerinita glutinata				18	4	3	9	10	11	4	9	2	9	9	6	4	5	3	5			
Globigerinoides conglobata					8	1	.5			.7	.4	.9	.3	.2	.3	.4	.4	.1	.5			
G rubra	50	100	64	52	27	28	36	39	34	35	34	33	32	40	40	33	33	34	35			
G. sacculifera	33				3	5	3	2	3	5	4	13	10	10	13	9	13	12	10			
Globorotalia hirsuta																			.1			
G. menardii					10	8	3	3	2	5	5	6	5	4	4	7	6	7	6			
G. punctulata				4		.8	3	1	2	2	2	3	3	3	2	1	2	2	.6			
G. scitula						1	4	3	6	2	2	2	1	1	2	1	2	.5	.6			
G. truncatulinoides			12	18	7	5	5	3	3	8	5	7	4	3	3	5	4	4	3			
G. tumida					3	1	1	1	.8	1	.2	.9	.2	1	1	1	2	.7	.5			
Hastigerina pelagica																			.1			
Orbulina universa						1	.2	.7	.2	2	.1	1	.8	3	2	4	2	3	4			
Pulleniatina obliquiloculata						12	4	4	4	7	3	3	6	4	2	4	4	5	4			
Sphaeroidinella dehiscens						.1		.2				.2				.2	.2		.1			

Table 24. Percentage distribution of planktonic Foraminifera in traverse VII.

TRAVERSE	I											II																					
STATION	211	210	209	208	207	206	205	204	202	203	201	16	17	18	19	20	21	22	23	15	24	14	13	12	11	10	9	8	7	6	5	4	3
DEPTH IN METERS	51	?86	?86	73	82	79	82	91	128	201	430	33	58	88	106	113	142	168	208	298	314	471	631	732	914	1298	1372	1417	1875	2468	2788	2972	3017
TOTAL BENTHONIC POPULATION	30	229	14	101	30	11	17	20	22	9	8	31	115	20	1	6	12	22	6	3	22	0	6	1	3	1	2	5	1	1	12	0	0
Alveolophragmium scitulum											2																						
A sp.					1			1																									
Ammobaculites sp. A										1						1	2	2															
Ammoscalaria pseudaspiralis														1																			
Bolivina albatrossi																							1					1					
B barbata		2		19														3															
B. ordinaria																		2															
B striatula spinata				6																													
Bulimina marginata																		3			1												
B striata mexicana																				1	1												
Buliminella cf. bassendorfensis		1		50								1																					
Chilostomella oolina																							2								1		
Cibicides aff. floridanus																												1					
C. wuellerstorfi																											1						
Epanides regularis																		2															
Globobulimina affinis & var.																								1	1								
Goësella mississippiensis		2	4	8	2	1	2	4	7	2				3		4	5	4	1												3		
Gyroidina orbicularis																										1	1	1					
Hormosina sp.											2																						
Miliolidae																														1			
Nonionella opima	4				2																2												
Nouria polymorphinoides																															5		
N sp.	24	114	3	5	9	2	14	2				25	64	10	1						1												
Osangularia cultur																							1										
Prateonina atlantica																															1		
P difflugiformis				1	3	6		5	4	5	1			2		1	1	2							1								
Reophax gracilis		26	2								1		1																				
R. hispidulus					2			1	4					1			1	2	1				1					1			2		
R. scarpiurus				1	2			3	2								1	1	4	1													
R. spp.																					6												
Robulus spp																												1					
"Rotalia" beccarii variants		33					1					5	8																				
Saccamminidae & related forms																	2																
Sphaeroidina bulloides																									1				1				
Textularia earlandi	2	50	3										42	3							1												
Trochammina cf. japonica											1																						
T quadriloba					9	2		4	2	1	1																						
T cf tasmanica			2															1															
T. spp. (juvenile)																					7												
Valvulineria mexicana																					2												
Virgulina mexicana																				1													
V pontoni				10																	1												
V tessellata																							1										
Miscellaneous spp.		1		1					3																								

Table 25. Distribution of living benthonic Foraminifera in traverses I and II (in numbers of specimens).

TRAVERSE	III													IV													V										
STATION	25	26	27	28	29	30	31	32	33	34	35	36	37	225	224	222	221	220	219	218	217	216	215	214	213	212	78	76	75	74	99	100	101	102	103	104	105
DEPTH IN METERS	22	53	77	106	155	205	373	400	1024	1262	1481	1719	2388	20	20	33	35	37	38	42	40	42	47	49	55	62	71	99	146	204	238	530	914	1097	1822	2213	1417
TOTAL BENTHONIC POPULATION	103	14	30	78	96	70	12	11	17	27	19	5	1	5	50	28	61	53	194	87	38	33	287	232	37	62	46	35	52	34	19	11	24	10	5	5	1
Ammoscalaria pseudospiralis																	3	1		2	3		5		13	1											
Angulogerina bella																	1		2			5	16	2													
Anomalinoides mexicana																																	1				
Bigenerina irregularis																			1			1	4														
Bolivina albatrossi						1		1	5	1																				2							
B barbata				21	45	10																															
B lowmani									1											1									1	1							
B ordinaria						11																															
B striatula spinata		1	7	3	1																	2	32	46					1								
B subaenariensis mexicana				32	35																							2	3	2							
Bulimina aculeata								2			2																					1			1		
B marginata					2	6																	1						2		1						
B. spicata																														1							
B striata mexicana																															2	1	1			1	
Buliminella cf bassendorfensis	8	8	8	10														2	1			2	5														
Cancris oblonga																	1	2	3	2			1				8	3	2								
Cassidulina carinata							1																														
C curvata																													1	1							
C neocarinata																													2			1					
C. subglobosa & variants																				2									3	1							
Chilostomella oolina									6	4																			4	5	2	6	12	2		1	
Cibicides aff floridanus																													7								
Cibicidina strattoni																8	8	5	3			2	3														
Dentalina - Nodosaria																				1			2														
Elphidium discoidale																	1		3																		
E gunteri																1							2	1													
E poeyanum																1																					
Epistominella vitrea		4	2	2	2					1				2			1		2	1		1	5	1									1				
Eponides antillarum																	3																				
E regularis						35	3																														
Pseudoeponides umbonatus																												1									
Globobulimina affinis & var.									2	11	5	1																					1				
Gaesella mississippiensis			1	2	3																		14		9	9	1	3									
Gyroidina orbicularis												1																									
Harmosina sp						1	1		1	1																											
Lagena spp & related forms				1	1					1		1										1															
Lenticulina peregrina																																					1
Miliolidae																	1		2			1															
Nonionella atlantica					1	1								1		5	1			2		3	4				1										
N opima	3		2		1					1				1	[illegible]	4	2[illegible]	17	119	40	1	5	104	63			26	16	4	3	1						
Nouria polymorphinoides														1	1	5		7	41	31	14	1	13	10			6	1									
N sp	7																								10	8											
Planulina foveolata																													1	3							
Prateanina atlantica																	15	15	2	1	19	7	70		2		1		2		1						
P difflugiformis						1	1	2																										1			
Pullenia bulloides								1																						1					1		
P quinqueloba																																	6	1			
Pyrgo cf nasutus																			3										3								
Quinqueloculina compta																	1	1				1															
Q lamarckiana																		1																			
Reophax gracilis																								6													
R hispidulus								1		1	1																		4	[illegible]	2					1	
R irregularis																											2										
R scorpiurus																							1														
R spp																													2			1					
Reussella atlantica																			1					1													
Robulus spp				1																											2						
Rosalina bertheloti																	1																				
R cf concinna															5	2																					
R floridana																		1												2							
"Rotalia" beccarii variants	3	1															1		2	1			1														
Rotamorphina laevigata								1		1																			1					1	1	1	
Sphaeroidina bulloides										1																			1		1		1				
Textularia earlandi	11		1			1																			3[illegible]												
T mayori																1	1		1	1																	
Trochammina advena						1																															
T spp (juvenile)	71																																				
Uvigerina laevis																												1	1	1							
U. parvula																								1							5						
U peregrina								2	1				1																	1			1		2		
Valvulineria mexicana							4																														
Virgulina mexicana								1																													
V pontoni			9	3	4											1			2			1	3	11													
V punctata																		1	3	2							1	5			1						
V tessellata										4	11																							5			
Miscellaneous spp				3	1	[illegible]	2		1			2							3		1		1					3	7	8	1	1				1	

Table 26. Distribution of living benthonic Foraminifera in traverses III V (in numbers of specimens).

TRAVERSE						VI																					VII											
STATION	197	198	200	196	199	59	58	57	56	54	53	52	51	49	48	47	46	45	44	43	42	41	40	39	38	106	179	181	182	183	184	185	186	187	188	189	190	191
DEPTH IN METERS	549	549	600	713	735	91		106	113	128	139	146	155	183	223	446	555	631	650	677	823	860	960	1144	1573	2697	146	186	237	274	274	320	347	457	585	732	878	2999
TOTAL BENTHONIC POPULATION	11	16	7	11	12	15	4	4	4	15	12	1	5	3	5	6	11	5	1	9	9	5	2	1	0	1	5	5	6	4	4	6	0	4	0	5	2	6
Ammoscalaria tenuimarga																																						1
Bolivina albatrossi					1											2																						
B lanceolata						3				1																												
B minima											1																											
B striatula spinata									1	1																	5											
B subaenariensis mexicana																												1				1						
Bulimina aculeata			1	1	1																		1	1														
B alazanensis					1																																	
B spicata				2																																		
B striata mexicana		1			5																																	
Cancris oblonga						1				1																			1									
Cassidulina neocarinata																					1																	
C subglobosa & variants						1														1																1		
Chilostomella oolina	1	7		2										1		1	7	3		1												1						
Cibicides corpulentus											2																											
C aff floridanus																				1	1	1														1		
C mollis						1																																
C robertsonianus																																						1
C rugosa			1																																			
Dentalina - Nodosaria	1												1																		1			1				
Eggerella bradyi	1																																					
Epistominella decorata																					1																	
E exigua	1																1																					
E rugosa					1																																	
Eponides regularis													1																									
E turgidus	1																																					
Pseudoeponides umbonatus																				1																		
Gyroidina orbicularis																													1									
Haglundina elegans						1		2				1																										
Karreriella bradyi																			1																			
Lagena spp & related forms					1						1										1		1															
Miliolidae											1																	1										
Nonionella atlantica						1																																
Osangularia cultur				1																1	1																	
Planulina exorna							1																															
Proteonina atlantica						1			1	2																		1		1								
P difflugiformis	1		1																	2																		
Pullenia bulloides															1	1																						
P quinqueloba						1																																
Pyrgo murrhina																										1												
P cf nasutus										1																												
Reophax bilocularis										1																						1						
R guttifera																														1								
R hispidulus	1	1												2														1	1	1	1	1						1
R irregularis						1																																
R. scorpiurus	1	2													1							2																
R spp											1				1		2												1			1						
Robulus spp						1		1	1	2																					1							
Rosalina floridensis							1																															
"Rotalia" translucens	1																																					
Rotamorphina laevigata															1																							
Siphonina bradyana		1													1																							
S pulchra									1	4	2				1													1	1					1				
Sphaeroidina bulloides	1	1	2	1	1						1							2				1																
Trifarina bradyi							1													1																		
Trochammina globulosa																				1																		
Uvigerina flintii											1																											
U hispida - costata					1																											1		2				
U peregrina			2													2					2								1		1					2	1	
Valvulineria minuta																					1	1																
Virgulina tessellata	1	1		3																																		
Miscellaneous spp		2		1		3	1	1		2	2		3				1				1									1						1	1	3

Table 27. Distribution of living benthonic Foraminifera in traverses VI and VII (in numbers of specimens).

TRAVERSE	VIII								IX								X								XI											
STATION	154	153	152	151	150	149	148	146	140	141	142	144	145	137	108	136	134	131	130	129	128	127	126	124	123	122	121	120	113	110	111	1	2			
DEPTH IN METERS	117	146	183	366	585	914	1730	3164	256	320	421	914	2268	3160	3072	1051	950	1920	3200	3180	7737	2150	1317	914	1326	1829	2560	3246	2280	3218	3251	3237	3237			
TOTAL BENTHONIC POPULATION	12	40	13	10	6	2	1	1	3	6	2	6	1	0	0	4	5	1	2	0	3	1	14	11	6	6	7	0	3	0	0	0	0			
Alveolophragmium ringens																																				
A subglobosum						1																														
A. wiesneri		1																																		
Ammoscalaria tenuimargo				1																																
Bolivina goësii		1																																		
Bulimina aculeata																							3		1											
Cancris oblonga	1	1																																		
Cassidulina subglobosa & vars												1				2					1		2	1												
Chilostomella oolina				2																																
Cibicides aff floridanus					1																															
C. robertsonianus																					1					1										
C. umbonatus	1																																			
C. wuellerstorfi																									1											
Dentolina - Nodosaria																								2												
Epistominella decorata																										2			1							
E exigua																					1															
E. rugosa											1																									
Eponides polius																	1																			
E turgidus																											1									
Gaudryina (Pseudogaud) atlantica			1																																	
Gyroidina orbicularis																1	1				1					1										
Hoglundina elegans		2														1			1		1	1	1	1		1	1									
Lagena spp & related forms			1									1																								
Loticarina pauperata																									1											
Marginulina marginulinoides	1																																			
Miliolidae	2								1																		1									
Osangularia cultur													2								1		2	1												
Proteonina atlantica	1	3																																		
Pullenia bulloides						1											1																			
P quinqueloba	2								1												1		1			1										
Pyrgo murrhina																											1									
P cf. nasutus		2		1																																
Reophax hispidulus		2		1	2	1	1	1		1									1		1		1													
R irregularis	1	2																																		
R scorpiurus																							1													
R spp	2	1		2						1																	1									
Rabulus spp			1	3					1	1																										
"Rotalia" translucens																									1											
Ratamorphina laevigata												1																								
Seabrookia earlandi										2																										
Siphonina pulchra		8	8																																	
Siphotextularia curta																									1											
S. rolshauseni													1																							
Sphaeroidina bulloides	1		1									1					1				2		2	1	1											
Textulariella spp.										1																										
Triforina bradyi										1																										
Trochammina squamata & rel. spp																								1												
T spp (juvenile)																								1			1									
Uvigerina flintii		5	1																																	
U. peregrina					2							1							1				1		1											
Volvulineria minuta																													2							
Miscellaneous spp.		2															1				3			2												

Table 28. Distribution of living benthonic Foraminifera in traverses VIII-XI (in numbers of specimens).

TRAVERSE	STATION	DEPTH IN METERS	TOTAL PLANKTONIC POPULATION	Globigerina bulloides	G. eggeri	G. (juvenile)	Globigerinella aequilateralis	Globigerinita glutinata	Globigerinoides rubra	G. sacculifera	Globorotalia menardii	G. punctulata	G. truncatulinoides	Orbulina universa	Pulleniatina obliquiloculata
II	9	1372	7	1		4				1		1			
	8	1417	5			4									1
	6	2468	2			1								1	
	5	2788	11	2	1	2		2			2	1			1
	4	2972	5			5									
	3	3017	2				1		1						
III	34	1262	5	1	2	2									
	37	2388	6		1	5									
IV	222	33	2						2						
	221	35	2			1			1						
	220	37	1						1						
	218	42	2			2									
	215	47	1			1									
V	78	71	3			1				1	1				
	76	99	2			1									1
	75	146	3			3									
	74	204	6			3	1		1					1	
	99	238	2			1			1						
	100	530	3			3									
	103	1822	2										2		
	104	2213	1			1									
	105	1417	4			4									
	198	549	1								1				
VI	59	91	2		1						1				
	57	106	1												1
	54	128	1			1									
	53	139	2			2									
	49	183	2		1				1						
	48	223	2		1										1
	47	446	2				1		1						
	46	555	1		1										
	44	650	5			5									
	43	677	2			2									
	42	823	3			3									
	39	1144	2			2									
	38	1573	3			2	1								
	106	2697	1			1									

Table 29. Distribution of living planktonic Foraminifera in traverses II-VI (in numbers of specimens).

TRAVERSE	VII										VIII										IX										X										XI									
STATION	181	182	183	184	185	186	187	188	189	190	191	154	153	152	151	150	149	148	146	140	141	142	144	145	137	108	136	134	131	130	129	128	127	126	124	123	122	121	113	110	111	1
DEPTH IN METERS	186	237	274	274	320	347	457	585	732	878	2999	117	146	183	366	585	914	1730	3164	256	320	421	914	2268	3160	3072	1051	950	1920	3200	3180	1737	2150	1317	914	1326	1829	2560	2280	3218	3251	3237
TOTAL PLANKTONIC POPULATION	3	6	1	1	3	1	2	2	2	8	3	5	9	2	9	5	29	4	3	9	11	3	3	6	1	4	74	21	5	4	7	32	12	32	32	6	21	7	24	2	3	3
Candeina nitida																1																															
Globigerina bulloides																	2							1			1							2	2	2			3		1						
G. digitata																												1																			
G. eggeri	1																3			1						2	2					6	2	1	4		4									
G. (juvenile)		4	1		2				2	3	2		6		4		3	1		5	5	2	2	3			57	11	4	1	2	6	5	16	4		7		8		1	3
Globigerinella aequilateralis												1	1			1	7						1			1	4	1		1		10		3	4	3	2	2	4		2	
Globigerinita glutinata	1						1			1	1				1			1			2			1						1		1		3		1								
Globigerinoides rubra										1					1	1	4			1						1	2	2		1				2	1		1	1						
G. sacculifera																	1										1							1	1					1				
Globorotalia menardii		1								2		2		1		1	1				1	1		1			5	1				6	1	2	12		4		4				
G. punctulata																											1							1		1		1	1				
G. scitula										1																		1							2				2				
G. truncatulinoides					1		1	1					1		2		5		2	2							1	1				2		1	1	1			2				
G. tumida																1																			1								
G. (juvenile)																													1														
Orbulina universa												1	1				1		1		1							2				1								1			
Pulleniatina obliquiloculata	1	1		1		1		1				1		1	1		2	2			2				1			1			3	1				3		2				

Table 30. Distribution of living planktonic Foraminifera in traverses VII-XI (in numbers of specimens).